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ABSTRACT

These ten performance-based lesson plans concentrate on tasks related to energy conservation in the home. They are (1) caulk cracks, holes, and joints; (2) apply weatherstripping to doors and windows; (3) add plastic/solar screen window covering; (4) arrange furniture for saving energy; (5) set heating/cooling thermostat; (6) replace faucet washer; (7) select appliance using energy guide labels; (8) install shower flow control; (9) insulate water heater; and (10) make a draft stopper. Each plan of instruction contains some or all of the following information: task; performance objective; teacher preparation of learner (establish set/motivation); content of lesson, including enabling objectives/content, methods/activities, and resources; summary; criterion-referenced measure; assignment; and transparencies and handouts. (An energy bibliography and list of audiovisual materials available through Alabama Power Residential Energy Advisors are found at the beginning.) (YLB)

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ENERGY CONSERVATION IN THE HOME

Performance Based

LESSON PLANS

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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August 1980

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Drake, George R. Weatherizing Your Home. Reston, Virginia: Reston Publishing Company, Inc., 1978.....$16.95

Hand, A. J. Home Energy How-To. New York: Book Division, Times Mirror Magazine, Inc. 1978.....$ 9.95

Video Material available through local Alabama Power Residential Energy Advisors:

Slide program with tape:

THE HOME ENERGY CHECK
Shows how to check the home for energy losses and how to correct these problems.

Films:

A CAP IN THE GAP - 16mm film - 25 min.
Excellent presentation of how to build and install storm windows covered with plastic, weatherstripping, caulk, install insulation and provide attic ventilation.

THE ENERGY GAME - 16mm film - 20 min.
Suggest an energy check of the home and shows additional insulation installation techniques including under the house.

Department of Energy: available on loan
"APPLIANCE LABELING WORKSHOP" 47 slides with script, suggested activities and other printed material.

Order from:
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HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Caulk cracks, holes and joints.

PERFORMANCE OBJECTIVE: Given caulking, caulking gun or squeeze tube and other necessary equipment, caulk a crack, joint or hole. The hole, crack or joint must be sealed with caulk evenly applied.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: _____

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Explain how holes, cracks and joints waste energy
- State objectives and give an overview of the lesson.
- Emphasize importance of the task.

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
r. Around joints in gutters and downspouts s. Around drip caps over doors and windows		
4. Select type of caulking: a. Oil base b. Silicone c. Latex and butyl d. Special caulks	. Illustrate/display types of caulking. . Discuss each type of caulking.	. Transparencies . Chalk board . Samples of caulking
5. Apply caulking: a. Clean the surface b. Select the proper caulk for the job c. Clean hardened caulk from the gun spout d. Insert cartridge e. Cut spout at 45^{o} angle f. Apply caulk g. Clean equipment	. Demonstrate application of caulking. . Have students practice applying caulk. . Evaluate application.	. Caulk . Caulking equipment . Surfaces with holes, cracks, etc. . Putty knife . Cleaning materials

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble equipment and materials	. Display and discuss use of each item.	. Putty knife . Caulking gun . Squeeze tubes
2. Explain reasons for caulking: a. Stops uncontrolled air flow b. Increases comfort c. Saves on heating and cooling		. Pictures of holes, joints, cracks.
3. Explain where caulking is to be applied: a. Where frames of doors and windows meet the exterior wall b. Around window air conditioners and coolers c. Around pipes entering walls and floors d. Around exhaust vents e. Seams where siding meet f. Between foundation and siding g. Around and under thresholds h. Where different materials meet i. Around electrical entrances j. Where utility services enter the house k. Between joints in siding l. At molding around doors and windows m. Where siding has split and cracked n. Around eave vent and gable vent molding o. Around permanent storm windows p. Where add-on room joins the main structure q. Around chimneys and flashing	. Locate areas where caulking needs to be done in the school/home economics department. . Discuss visuals illustrating need for caulking.	. Transparencies . Pictures of areas needing caulking

IV. SUMMARY: (Review main points, draw conclusions)

- Summarize main points.
- Emphasize areas of concern.

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Have students apply caulking to an assigned area according to demonstrated procedures. The hole, crack or joint must be sealed with caulk evenly applied.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Ask students to identify areas around their own homes which would be improved with caulking. Report action taken.

WHERE TO CAULK

AROUND WINDOWS

WHERE ADDITIONS ARE A JOINED

AROUND VENTS

AROUND CHIMNEYS AND FLASHING

WHERE DIFFERENT MATERIALS MEET

AROUND FANS AND (AIR CONDITIONERS)

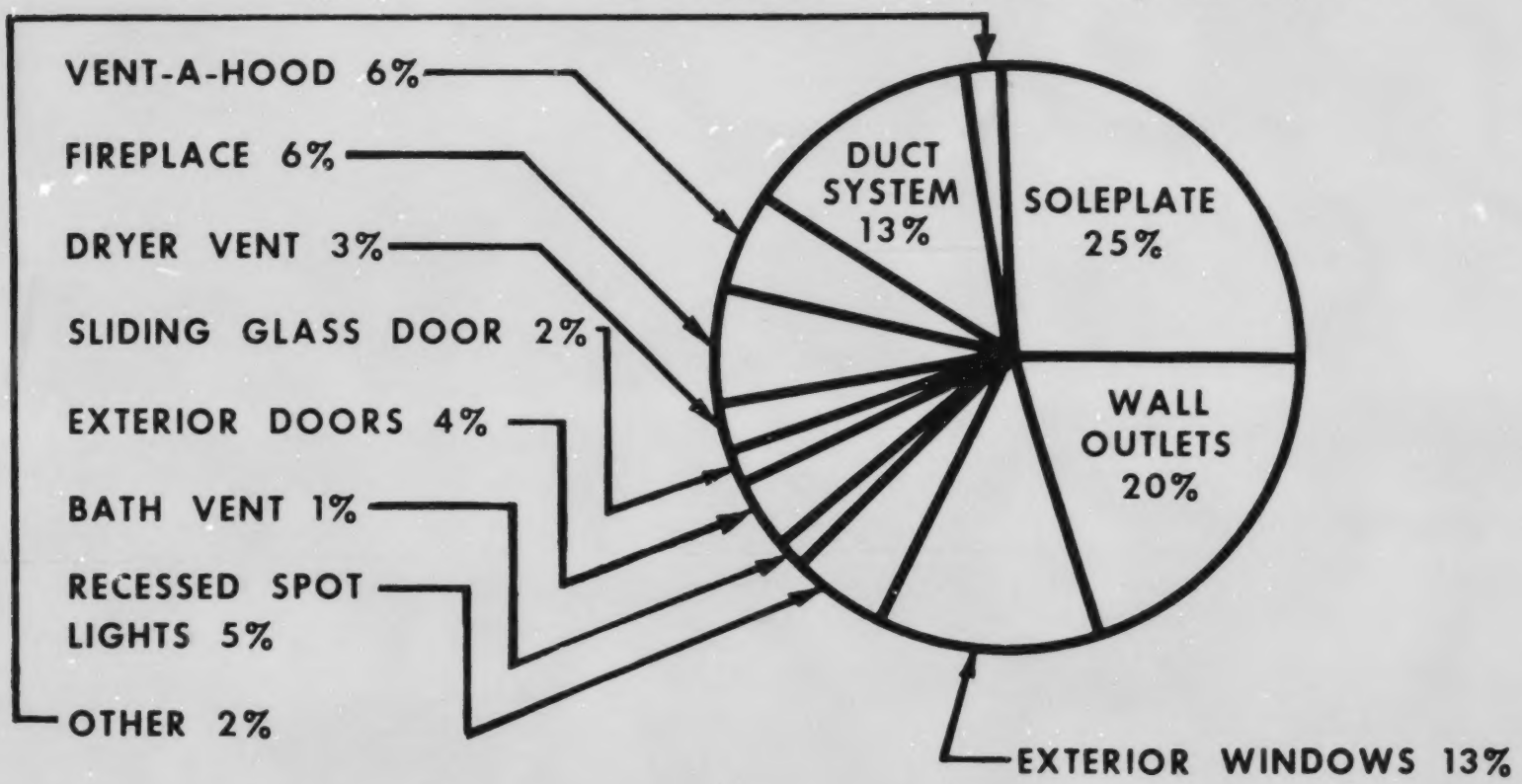
AROUND DOORS

CRACKS IN SIDING

AROUND PIPES AND WIRES

BETWEEN FOUNDATIONS AND WALLS

AIR LEAKAGE TEST RESULTS
FOR AVERAGE HOME OF 1,728 SQ. FT.



Caulking

Caulk is used to stop infiltration through cracks, joints and holes in the structure. Infiltration is uncontrolled air flow through small holes and cracks. In the winter, warm air leaks out through these small spaces and cold air leaks in. The opposite happens during the summer.

Caulk also increases the comfort of the home by blocking out chilly drafts, insects, dust and moisture.

When doors and windows are properly glazed and weatherstripped, air will continue to flow through small cracks in the walls, floors and roof. Individually, these cracks would have little effect, but when combined, they allow drafts which may add 10 percent to heating and cooling costs.

Why caulking is needed

Houses are constructed with various materials that connect at joints. As the house ages, cracks will develop at each joint. These cracks are caused by the following:

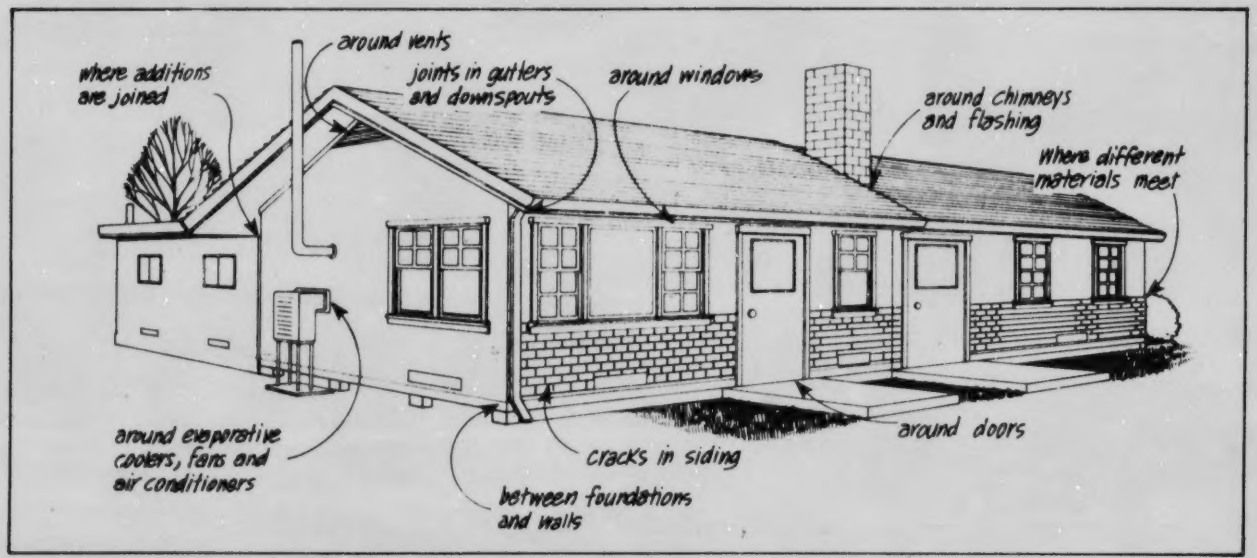
- Normal aging of the material
- Thermal expansion and contraction (sweiling and shrinking) caused by temperature changes and moisture
- Dry rot caused by moisture
- Vibration
- Poor construction
- Improper maintenance
- The lack of paint and other protective finishes

Caulk is used to seal these cracks and holes cut for pipes, wires and vents.

where to caulk

Normally, caulk is applied to the outside of houses. However, caulk can be applied inside around pipes, vents and wires that extend through the ceiling to an unheated attic.

Caulk is used on the outside of the house where two materials meet. As a rule of thumb, one should caulk windows, doors and the joints where different types of materials meet.



Drawing 1 Areas in a home that may require caulking.

Shown in Drawing 1 are areas that may require caulking. Use the following list when checking a house for caulking needs:

- Where frames of doors and windows meet the exterior wall
- Around window air conditioners and coolers
- Around pipes entering exterior walls and floors
- Around exhaust vents
- Seams where siding meet
- Between foundation and siding
- Around and under thresholds
- Where different materials meet
- Around electrical entrances
- Where utility services enter the house
- Between joints in siding
- At molding around doors and windows
- Where siding has split and cracked
- Around eave vent and gable vent molding
- Around permanent storm windows
- Where an add-on room joins the main structure
- Around chimneys and flashing
- Around joints in gutters and downspouts
- Around drip caps over doors and windows

types of caulking

The first caulking compounds were a mixture of clay and mud. Clay and mud caulk were effective, but soon cracked and fell apart. Later it was discovered that oil could be mixed with clay to delay cracking. Today, oil base caulk is still used, but many different types of more durable caulks are available.

Caulks vary considerably in price and quality. The better caulks are usually more expensive. As a rule, you get what you pay for.

Caulks may be divided into four groups:

1. **OIL BASE** — least expensive, but also the least effective.
2. **SILICONE** — the "super caulk." Highest quality and most expensive.
3. **LATEX AND BUTYL** — medium priced, suitable for most caulking jobs.
4. **SPECIAL CAULKS** — used for special applications such as very wet areas or very wide cracks.

Caulking is available in two consistencies: knife-grade and gun-grade. Knife-grade caulk is sold in cans and is applied with a putty knife (Drawing 2). Gun-grade is available in:

- Squeeze tubes for small, one-time special jobs. Different colors are available in squeeze tubes for color matching.
- Large bulk containers for refilling bulk-type guns.
- Ten and twelve-ounce cartridges that fit into caulking guns.

Gun-grade cartridges are recommended for most weatherization programs. Gun-grade bulk is recommended for programs which do extensive caulking.

The major types of caulk, their use, their advantages and disadvantages are discussed below.

Oil base caulk

Oil base caulk is the least expensive. It will stick to most any material. However, oil base caulk has many disadvantages and is not recommended for outside use.

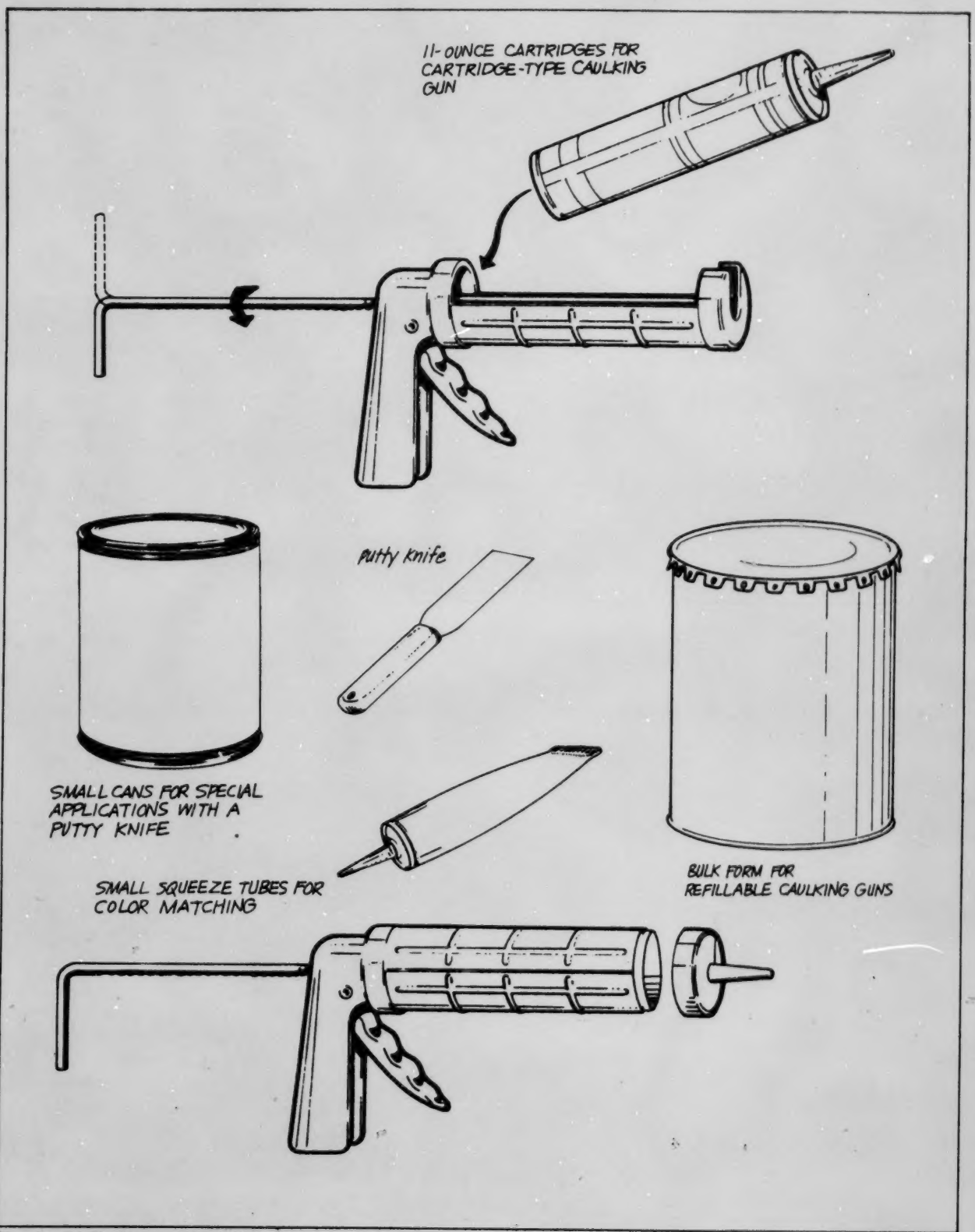
Oil base caulk will dry out and crack in a relatively short time. It loses its elasticity and quickly cracks and peels when applied to moving joints.

Oil base may be used in small inside wall cracks, in small outside cracks, and on primed surfaces that will be painted.

Latex caulk

Latex caulk is available in two types: regular and acrylic. Acrylic is better and more expensive. Both types of latex caulk have the following characteristics:

- Dry in 15 to 30 minutes
- Shrink some during curing
- May be applied to damp surfaces
- Should not be used on metal surfaces
- Should be painted with latex paint immediately after application to prolong life


11-OUNCE CARTRIDGES FOR CARTRIDGE-TYPE CAULKING GUN
putty knife
SMALL CANS FOR SPECIAL APPLICATIONS WITH A PUTTY KNIFE
SMALL SQUEEZE TUBES FOR COLOR MATCHING
BULK FORM FOR REFILLABLE CAULKING GUNS

Drawing 2 Equipment needed for caulking a home.

- May be cleaned from hands and tools with a damp cloth

Latex is recommended for extensive caulking if it will be painted after application. It is not recommended for moving joints.

Butyl caulk

Butyl caulk is recommended for most all-purpose applications. It is more flexible and durable than latex. Butyl caulk has the following characteristics:

- May be applied to any type of material
- May be painted, but painting is not required to prolong its life
- Will shrink slightly while curing
- Can be purchased in various colors
- Requires paint thinner for clean up

Silicone caulk

Silicone is very durable, but expensive. It will outlast most other caulks by many years and will adhere to most any surface. Silicone is excellent for large joints which expand and shrink because it will stretch up to seven times its cured width.

Silicone may be purchased in clear form or in different colors. Clear silicone is excellent for sealing small holes and cracks in glazing; and interior cracks where other caulking would look unattractive.

Silicone is not recommended for general all-purpose caulking because it is expensive and difficult to smooth during application. Silicone will also break down in excessive sunlight.

When in doubt about which caulk to use, choose **BUTYL** for most all-purpose applications. Choose **SILICONE** for large joints which expand and shrink.

Special caulks

There are a number of special caulks made for almost any special caulking need. Below are several commonly used special caulks:

NITRILE RUBBER — used for very high moisture areas.

NEOPRENE RUBBER — used for concrete walls and foundations. Neoprene rubber shrinks moderately and may be used on moving joints.

ROPE CAULK — used for sealing wide cracks temporarily. It cannot be painted and does not dry out or shrink.

FOAM — used for filling large holes, cracks and joints. Foam caulk is purchased in pressurized cans. It leaves the can as a sticky foam and will adhere to most surfaces. As it cures, it expands to 2½ times its original volume.

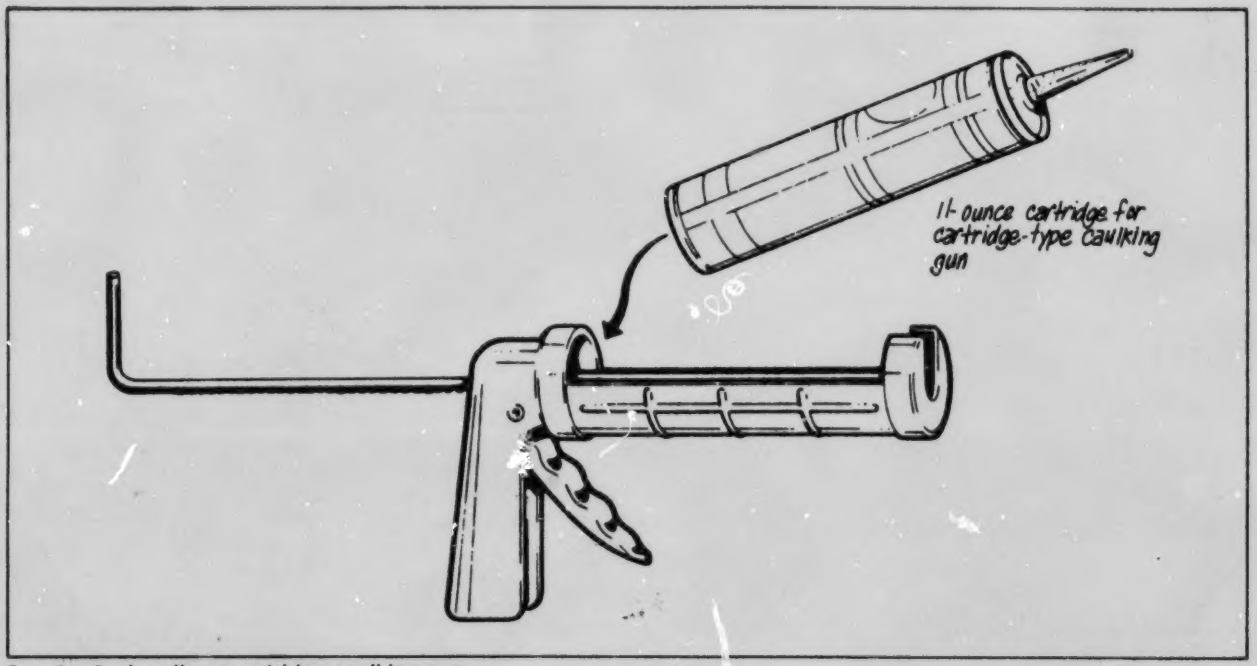
BUTYL GUTTER AND LAP SEAL — used for sealing lap joints in sheet metal and corrugated metal roofing. It is also used for joints in gutters and downspouts.

caulking techniques and preparation

Always read the label before using a caulk. Some types are flammable, will irritate the skin, or give off dangerous vapors. Manufacturers include directions and precautions which will help you use their product more effectively.

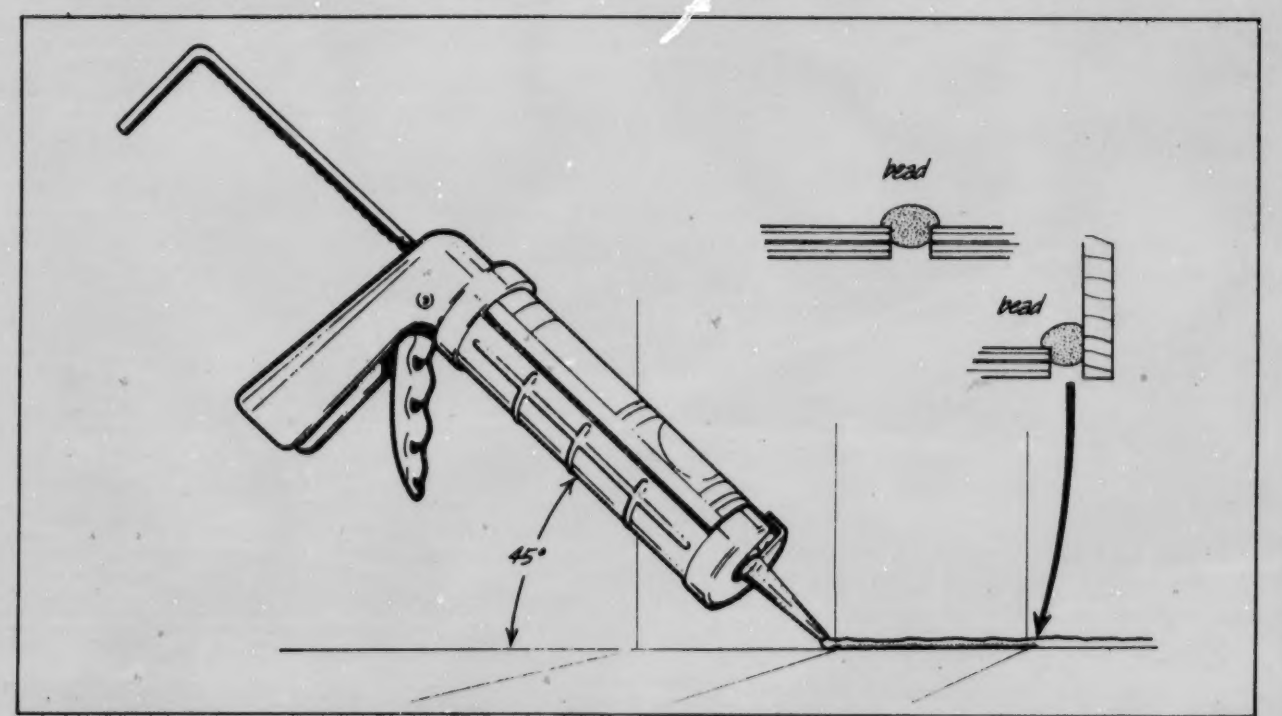
Regardless of the type, the hints below will be helpful when caulking:

1. Clean the surface to be caulked. Oil, grease, dust, dirt, and old caulk must be removed from the joint or crack. The joint must also be dry if any caulk except latex is applied.
2. Select the proper caulk for the job.
3. Clean hardened caulk from the gun spout.
4. To insert the cartridge, the plunger must be in the retracted position. It may be retracted by turning the teeth face up and pulling back on the plunger as shown in Drawing 3. After inserting the cartridge, turn the teeth face down toward the trigger and push the plunger until the teeth engage.
5. Cut the spout at a 45° angle. The distance the cut is made from the tip will effect the size of the bead. The cut should be made with a sharp knife (Drawing 5). Do not use snips.

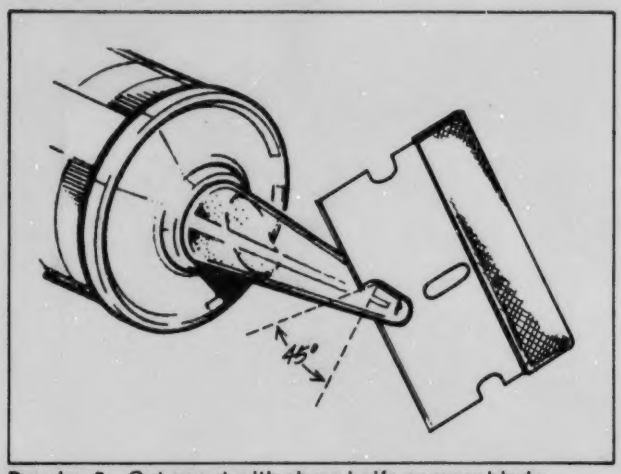


Drawing 3 Loading a cartridge caulking gun.

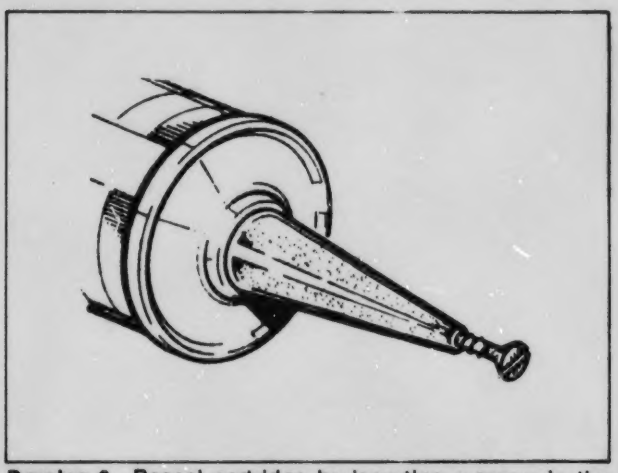
6. When applying the caulk, hold the gun at a 45° angle to the surface as shown in Drawing 4. Pull the gun toward you while gently pumping the trigger to keep caulk flowing evenly. The bead should overlap the crack on both sides.
7. For larger joints, a putty knife may be needed to smooth out the bead. However,



Drawing 4 When caulking, hold gun at 45° angle.



Drawing 5 Cut spout with sharp knife or razor blade.



Drawing 6 Reseal cartridge by inserting a screw in the spout.

best results are usually obtained when a putty knife is not used. When using latex, a wet finger is excellent for smoothing out beads.

8. To prevent caulk from flowing out of the nozzle when finished, twist (turn the teeth upward) and retract the plunger.
9. Reseal the cartridge by inserting a screw in the nozzle (See Drawing **6**).

Caulking big cracks

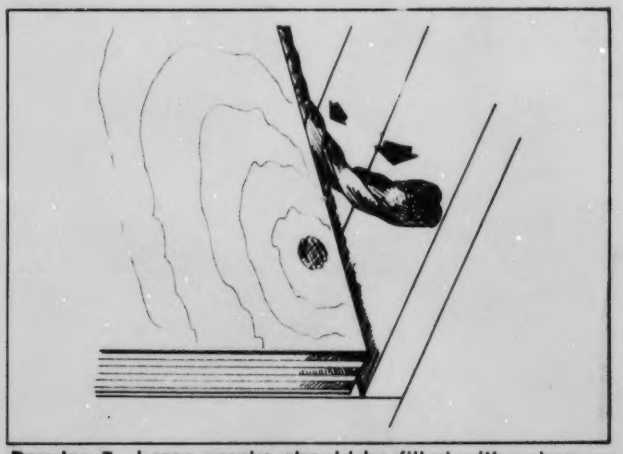
There is a limit to the size of crack that can be caulked. Cracks larger than 1-inch should not be caulked. They should be repaired with molding or siding batts.

Cracks larger than 1/2-inch can be caulked, but require filling before caulking. These cracks may be filled with oakum (a treated hemp rope) available in plumbing supply stores (See Drawing **7**). If oakum is not available, foam weatherstripping or fiberglass insulation are effective substitutes. Apply a double bead of caulk after inserting oakum, as shown in Drawing **8**.

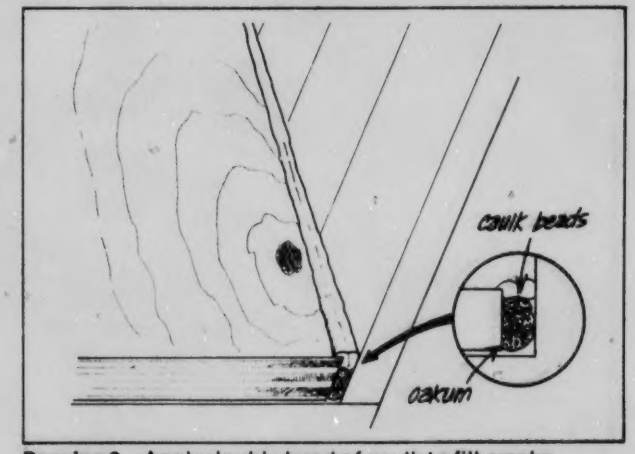
Clean up

When the caulking job is complete, the tools and gun should be cleaned before the caulk hardens. The solvent used for cleaning is usually stated on the cartridge.

Latex or acrylics can be cleaned with water. Paint thinner or mineral spirits are used to clean other types of caulk.



Drawing 7 Large cracks should be filled with oakum or fiberglass before caulking.



Drawing 8 Apply double bead of caulk to fill cracks.

It is a good idea to keep several rags and a can of paint thinner with your caulking equipment.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Apply weatherstripping to doors and windows

PERFORMANCE OBJECTIVE: Given weatherstripping, necessary tools and equipment, door or window and printed directions, apply a section of weatherstripping. When forced air is applied to section from outside, there will be no movement of plastic bag attached to clothes hanger when held inside. (Absence of air infiltration)

I. TEACHER PREPARATION

Tools and Equipment: _____

_____

Instructional Materials: _____

_____

References: _____

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Define and discuss infiltration.
- Explain how energy is lost through infiltration.
- State objective and give overview of the lesson.
- Emphasize values derived from weatherstripping.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble equipment and supplies.	. Display types of weatherstripping.	. Samples of weatherstripping
2. Select types of weatherstripping: . Jamb . Interlocking . Spring and cushion metal . Gasket . Door bottom . Rain drip . Door shoe . Automatic door bottom . Door sweep . Threshold . Interlocking . Saddles . Gasket . Specialty	. Discuss each type of weatherstripping and use for each. . Students observe type of weatherstripping.	
3. Weatherstripping windows . Select type . Install according to printed directions	. Demonstrate weatherstripping a window. . Provide students with printed directions for weatherstripping . Have students apply a section of weatherstripping to window.	. Window . Selected weatherstripping . Printed directions . Tools
4. Weatherstrip doors . Inspect door system . Repair any defects . Select type of weatherstripping . Install according to printed directions	. Provide students with printed directions. . Have students apply a section of weatherstripping to door.	. Door . Selected weatherstripping . Printed directions . Tools

IV. SUMMARY: (Review main points, draw conclusions)

- Review main points as necessary.
- Emphasize any problem areas.

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Have students apply a section of selected weatherstripping, following printed directions. Evaluate according to printed directions.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Explain what will be covered in next section.
- Assign students to do follow-up reports on how weatherstripping can save energy.
- Make other appropriate assignments.

Weatherstripping

Weatherstripping is used to stop infiltration around doors and windows. Infiltration is uncontrolled air flow through small holes and cracks. In the winter warm air leaks out and cold air leaks in. The opposite takes place in the summer.

Small cracks around doors and windows may not appear to be large enough to allow substantial infiltration. But if all the small unsealed spaces in a room were combined, they could add up to a hole the size of a basketball. Think about a hole that size in the wall of each room, and you will get an idea of how much cold air comes in during the winter.

In most older homes, infiltration may account for as much as 50 percent of the heating load. Weatherstripping can reduce that amount to 10 percent and reduce the cost of heating and cooling for the homeowner.

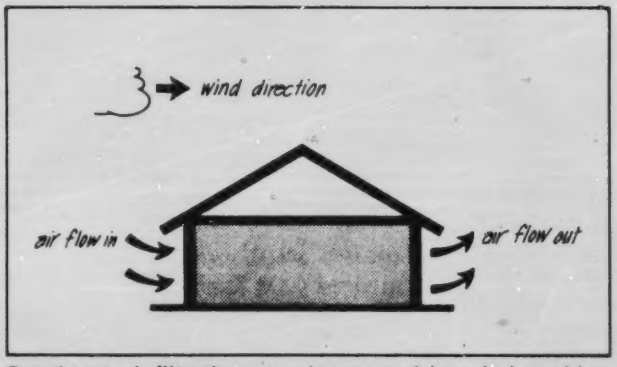
Proper weatherstripping does more than reduce the heating and cooling bill; it also makes the home more comfortable by shutting out noise, dust, humidity and light.

Understanding Infiltration

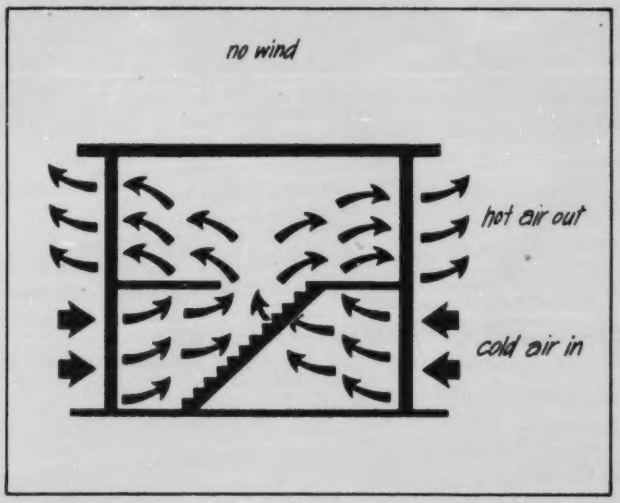
The concept of infiltration is quite simple. It is caused by wind movement outside the house or by the "chimney effect" inside the house.

During winter when wind blows against an outside wall, it forces cold air through cracks and draws warm air from the house (Drawing 1).

The "chimney effect" is caused by a difference in the inside and outside temperature. Warm inside air rises and leaks out of cracks in the upper levels of the structure; a vacuum is created on the lower level which draws in cold air (Drawing 2). The "chimney effect" can produce air movement equal to a 10-mile-per-hour wind in an unweatherstripped two-story home heated to 68°.



Drawing 1 Infiltration may be caused by wind pushing against the structure and forcing air through the cracks.



Drawing 2 The chimney effect is created when hot air rises and leaks out of cracks upstairs, causing cold air to be pulled in downstairs.

It is a waste of money to insulate a house if infiltration is left unchecked. Both the Community Services Administration and the Department of Energy require that infiltration be stopped before other energy conservation materials and devices are installed.

types of weatherstripping

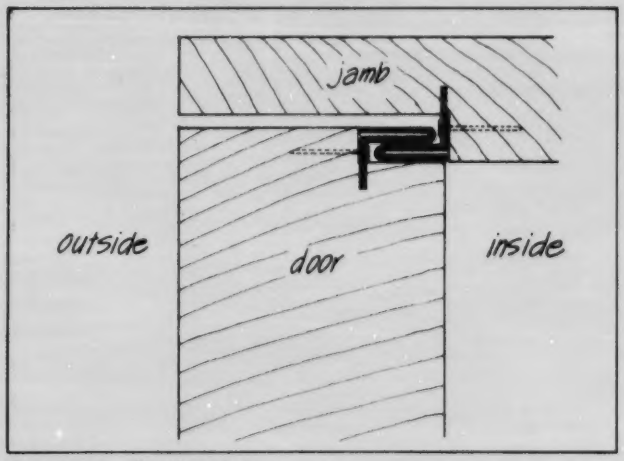
There are many different types of weatherstripping on the market. In this booklet weatherstripping will be classified in three major types: jamb, door bottom, and threshold.

Jamb Weatherstripping

Jamb weatherstripping is used to seal windows and doors. It is available in interlocking, spring metal or gasket types.

INTERLOCKING jamb weatherstripping consists of two parts: one part fastens to the door edge and the other part fastens to the jamb (Drawings **3**, **4**, **5**, and **6**).

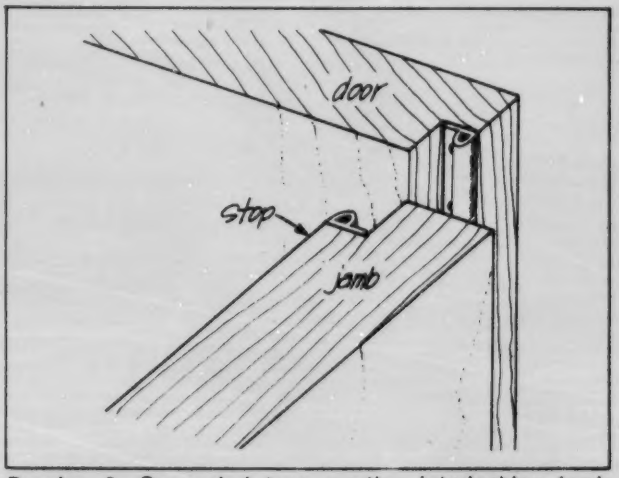
This type can be concealed (installed in a rabbet) in the door which makes it less obtrusive and protects it from damage and dents (Drawings **3**, **4**, and **6**).



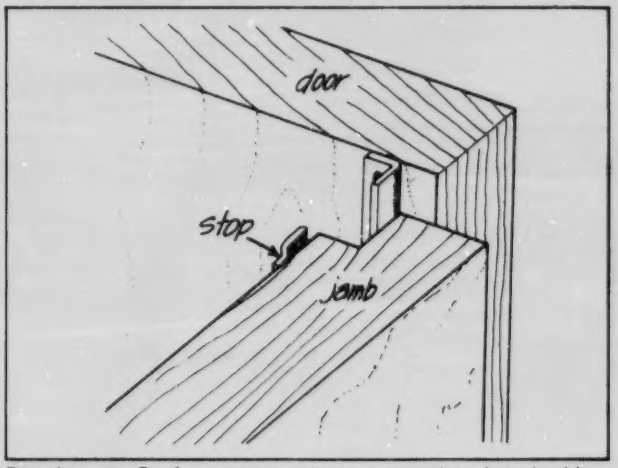
Drawing 6 Sectional view.

Interlocking should be used in weatherization programs only when there are extreme water problems. It should not be used in freezing climates because ice will form in the channels, causing the door to bind and the interlocking hook to tear off. Small pieces of rock will wedge into the channels and cause similar problems.

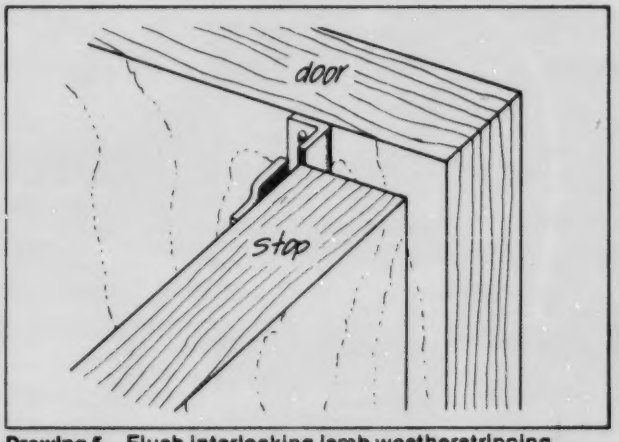
SPRING AND CUSHION METAL weatherstrippings are thin, flexible metal strips which compress to form a seal when the door or window is closed.



Drawing 3 Concealed type mortise interlocking jamb weatherstripping.



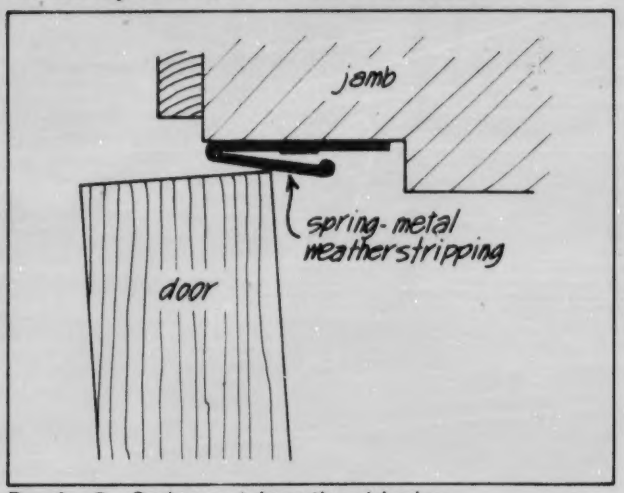
Drawing 4 Surface-mounted type mortise interlocking jamb weatherstripping.



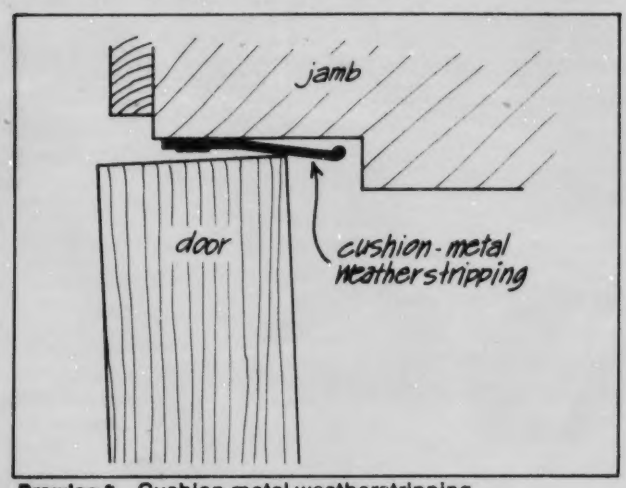
Drawing 5 Flush interlocking jamb weatherstripping.

Spring metal is available in rigid V-shaped strips which are nailed or screwed to the jamb (Drawing 7).

Cushion metal (Drawing 8) is available in rolls or rigid strips. Rigid spring metal provides a better seal than roll, but has a tendency to cause the door to stick.



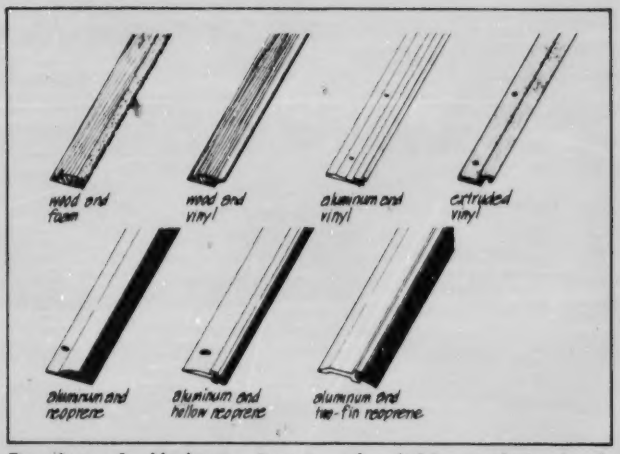
Drawing 7 Spring-metal weatherstripping.



Drawing 8 Cushion-metal weatherstripping.

Both spring and cushion types provide an excellent seal and are attractive because they are concealed when the door or window is shut. However, they 1) make doors and windows harder to open and close, 2) are noisier than gasket or interlock, 3) vibrate and hum during winds, and 4) often wear out because of compressive friction.

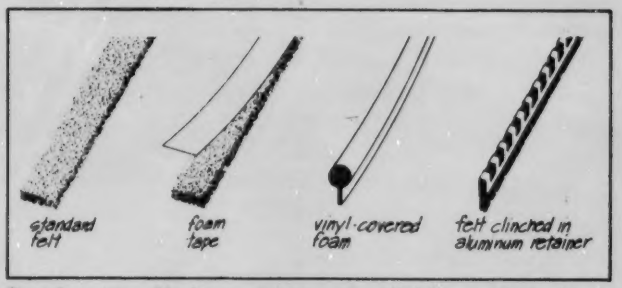
GASKET weatherstripping is available in rigid or pliable form.



Drawing 9 Various types of rigid gasket jamb weatherstripping.

Rigid-gasket (Drawing 9) consists of a gasket material attached to a rigid strip. It is more durable than the pliable-gasket and, therefore, superior to pliable for most applications.

Pliable-gasket consists of a felt or foam material packaged in rolls (Drawing 10). Pliable is less expensive than rigid, but is also less durable.



Drawing 10 Various types of pliable gasket jamb weatherstripping.

Felt-type pliable is tacked in position or is clinched on one edge with an aluminum strip.

Foam-type pliable is produced from polyurethane, neoprene, sponge or sponge rubber. It is available with adhesive backing in several widths and thicknesses. It can be used for a variety of purposes; but is recommended only for use on windows and doors that are seldom opened, and for sealing around heating and cooling plants.

Vinyl-covered foam is the most durable of the pliable-gasket types. However, vinyl-covered and the other pliable types should not be used on doors and windows which are opened or closed regularly. Pliable-gasket

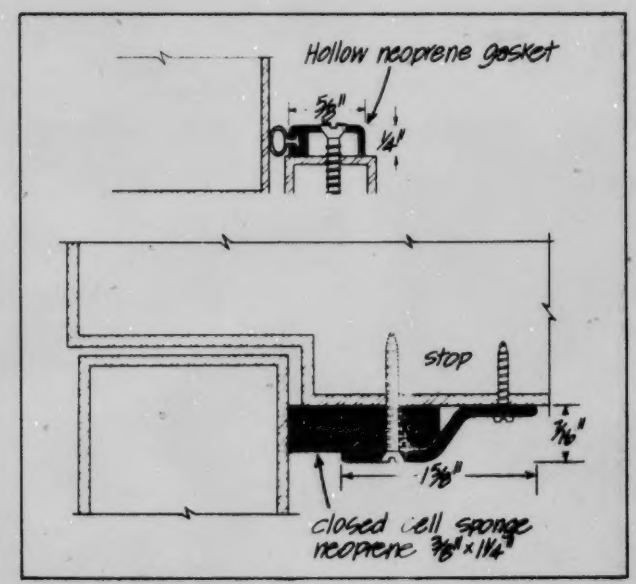
weatherstripping will not stand up to the wear and tear of constantly opened doors and windows.

Rigid gasket weatherstripping consists of a gasket material (sponge, felt, neoprene or vinyl) attached to a metal, wood or plastic strip. Drawing **9** shows a variety of rigid types.

Rigid gasket is made with wool, felt, neoprene, or rubber gasket. The wool gasket has a tendency to crack and separate. The felt gasket wears rapidly. The low-grade rubber gasket will harden or lose its seal.

Rigid neoprene gasket (Drawing **11**) is recommended for most windows and doors because:

- It is not as easily damaged as cushion or spring.
- The neoprene is very durable.
- The aluminum strip has slotted screw holes which allow for adjustment.
- It is easy to install.



Drawing 11 Two kinds of rigid neoprene gasket jamb weatherstripping.

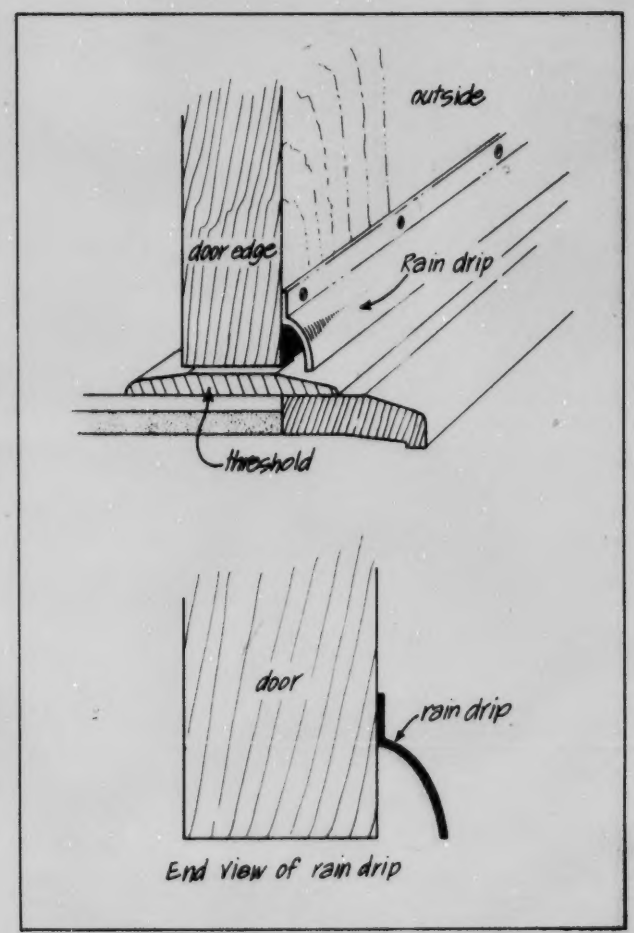
Door bottom weatherstripping

A door bottom, as the name implies, is weatherstripping that attaches to the bottom of the door. Door bottoms are sometimes referred to as underdoor weatherstrippings. They are available in several different types:

1. Rain drip
2. Door shoe
3. Automatic door bottoms
4. Door sweep

RAIN DRIPS, sometimes called drip caps, are available in various lengths. They are made from extruded aluminum (Drawing **12**) and are used to deflect the rain away from the threshold—the same way a roof overhang deflects water from windows.

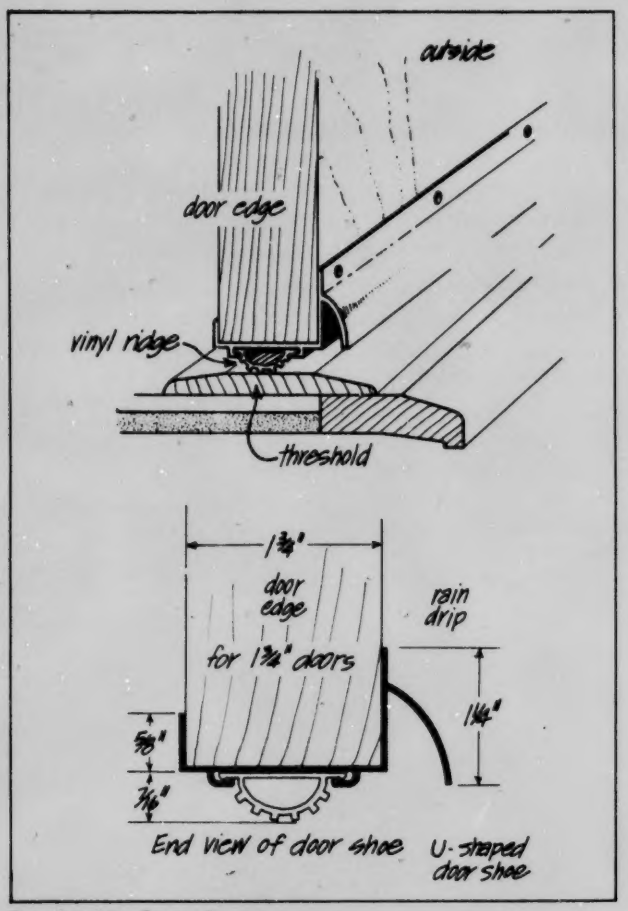
Rain drips should not be confused with door shoes. Door shoes extend underneath the door while rain drips do not.



Drawing 12 Rain drips.

DOOR SHOES are made of aluminum with neoprene gaskets. They fasten underneath doors and provide a seal between the door and threshold as shown in Drawing **13**.

Door shoes are used with saddle type thresholds. The door shoe and saddle threshold combination is superior to the gasket threshold because the gasket is under



Drawing 13 Door shoes.

the door where it cannot be stepped on and damaged. Door shoes are also adjustable; gasket thresholds are not.

Door shoes are available in standard lengths and may be cut to fit.

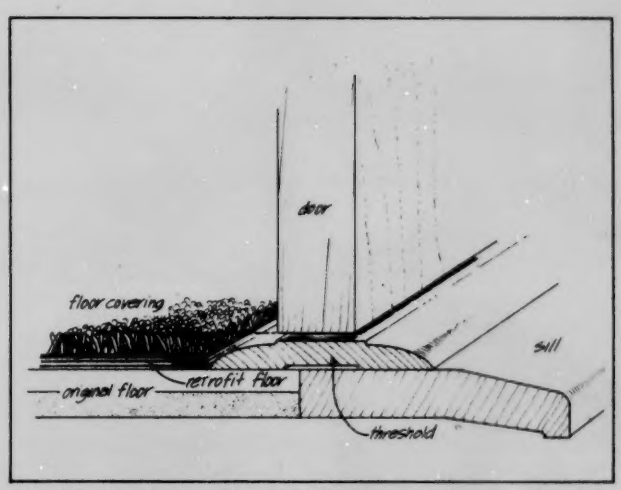
Occasionally, rain drips are found on the exterior door of a remodeled garage or an add-on room. Don't mistake this rain drip for a door shoe. Replace the rain drip with an "L" type door shoe.

AUTOMATIC DOOR BOTTOMS, sometimes called "automatic sweeps," are sophisticated and very effective, but costly. They consist of a metal housing which contains a neoprene or closed-cell sponge gasket sweep. When the door is closed, the sweep drops to the floor. It retracts when the door is opened.

Automatic door bottoms are specialty items. They are used when the home has high shag carpet and low thresholds. They may also be used in homes that have retrofit dual-flooring as shown in Drawing **14.**

Automatic door bottoms should not be used alone. They provide effective seals when used in combination with saddle thresholds as shown in Drawings **15** and **16.**

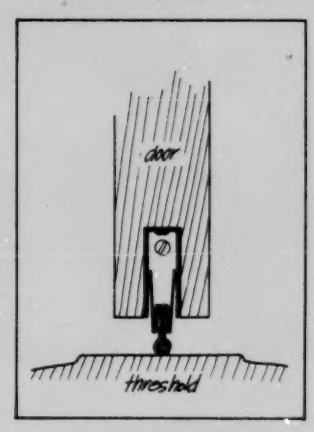
They may be purchased in two types: the mortise type and the surface type. They can be purchased in lengths to match standard doors.



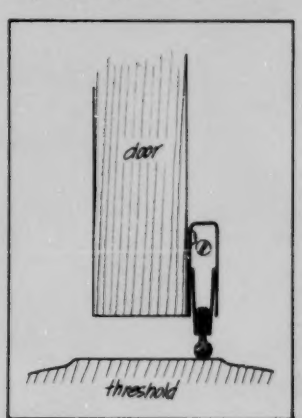
Drawing 14 Automatic door bottoms are used when the top of the threshold is level with the floor or when the floor has thick shag carpeting.

DOOR SWEEPS are very effective, inexpensive weatherstripping. Door sweeps (Drawing **17**) are made of extruded aluminum attached to a flexible neoprene or foam "sweep gasket."

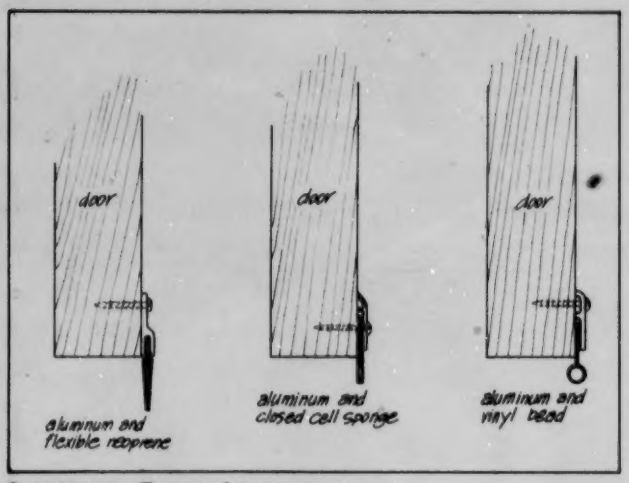
Door sweeps are usually mounted on out-



Drawing 15 Mortise mounted automatic door bottom.



Drawing 16 Surface mounted automatic door bottom.

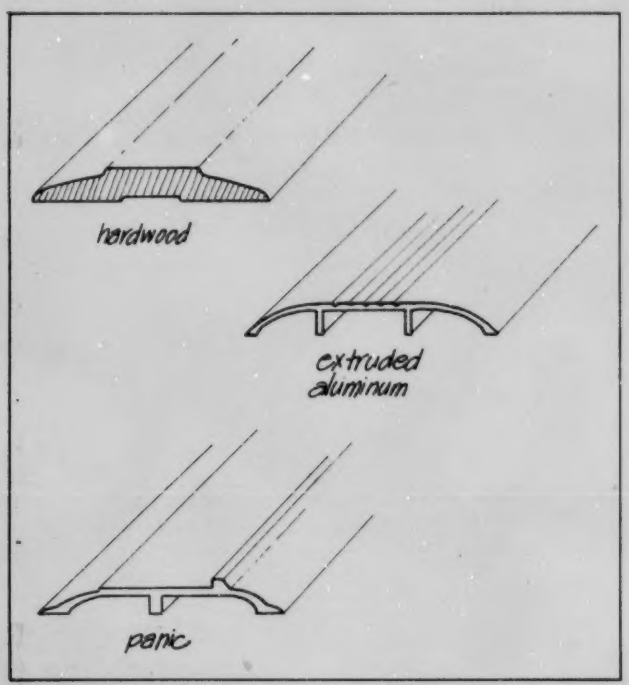


Drawing 17 Types of sweeps.

swinging doors. They may be used on an in-swinging door if the bottom of the door is more than one-half inch from the top surface of the floor covering. If the bottom of an in-swinging door is very close to the floor surface, an automatic sweep should be used.

Threshold weatherstripping

Thresholds are constructed of wood or metal. They are placed under the door and over the joint between flooring or between a floor and a doorsill.



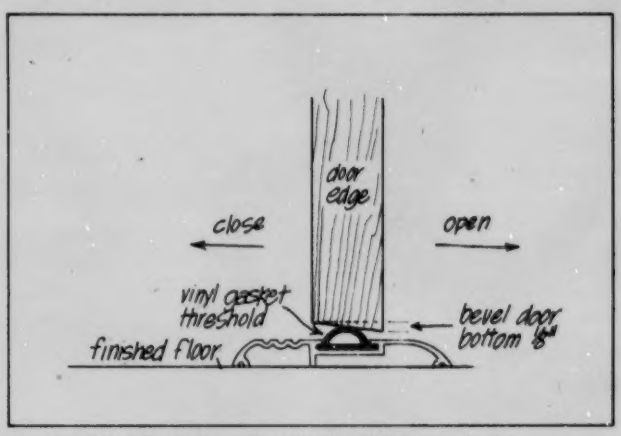
Drawing 18 Types of saddle thresholds.

Thresholds may be purchased in various types. The most common styles are saddle, gasket and interlock.

SADDLES are sometimes referred to as "plain thresholds." They are available in straight types for regular use or panic types for emergency doors (Drawing **18**). Straight thresholds are manufactured from wood or extruded aluminum. They are used extensively in weatherization programs.

Saddles alone ***do not stop infiltration.*** They must be used in combination with a door bottom to form a seal.

Oak saddles are recommended for hardwood floors and other places where metal would look obtrusive. They are inexpensive, but will not last as long as metal saddles.

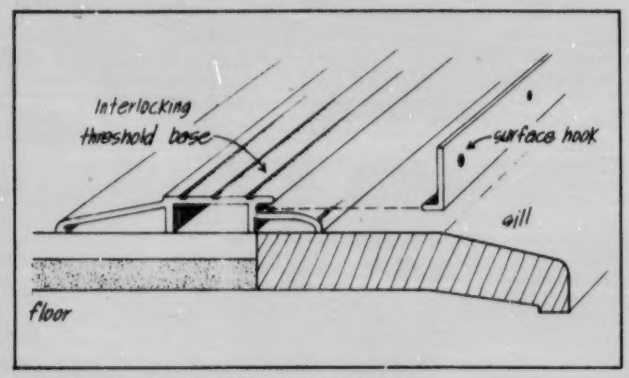


Drawing 19 End view of gasket saddle threshold.

Metal saddles are produced in bronze, stainless steel, black steel, and extruded aluminum. Aluminum is recommended for weatherization programs because it is the least expensive and is durable enough for residential use.

GASKET thresholds consist of a metal threshold with a vinyl bubble gasket attached to the top. When the door is closed, the bubble presses against the bottom of the door to provide a seal (Drawing **19**).

Gasket thresholds are not recommended for use in weatherization programs. They will fail to seal after a short period of time due to wear from foot traffic. It is also very difficult to find replacement gaskets because of the many types of thresholds on the market.



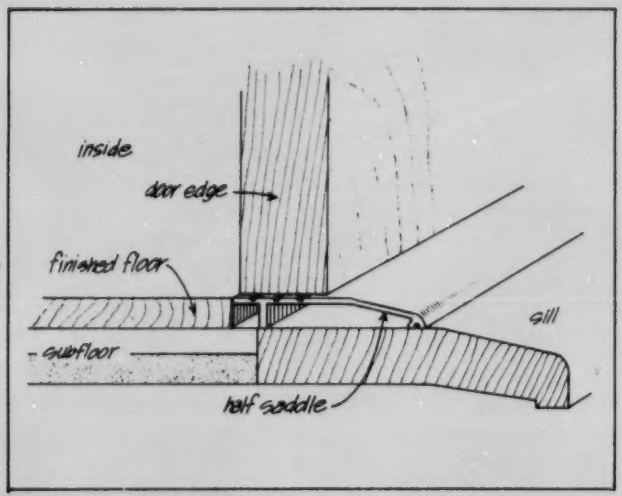
Drawing 20 Interlocking threshold.

INTERLOCKING thresholds are made from metal and consist of two parts: the threshold base which fastens to the floor and the hook strip which fastens to the bottom of the door (Drawing **20**).

Interlocking thresholds make an excellent seal. However, if the hook strip bends or if rocks and ice lodge in the channels, the door will not close and seal properly.

Interlocking thresholds are not recommended for weatherization programs because:

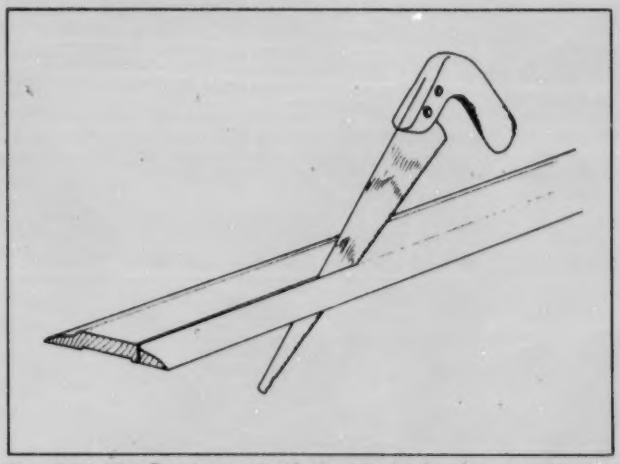
- They are difficult to install
- They do not work effectively in cold climates
- Gravel and other materials can lodge in the channels and prevent proper sealing or closing.



Drawing 21 Half threshold.

Specialty Thresholds

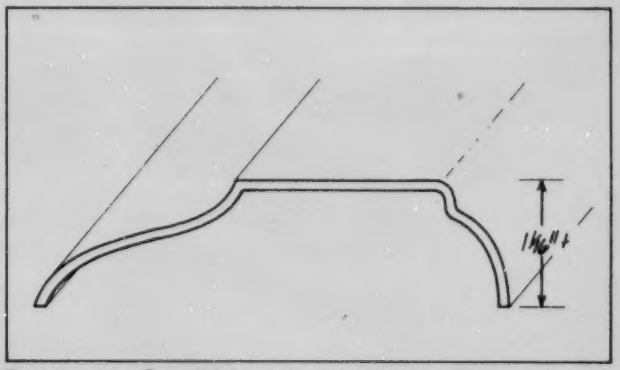
Many special types of thresholds are available to solve unique problems. The four special thresholds most often used in weatherization programs are: half, special high, offset and insulated.



Drawing 22 Cutting a half threshold from a hardwood saddle.

HALF THRESHOLDS are used where two floors of different levels meet or when the sub and finish floors are higher than the sill as shown in Drawing **21**. They are also used to provide wheelchair entrances.

A half threshold can be made by cutting one bevel from a hardwood saddle (Drawing **22**).

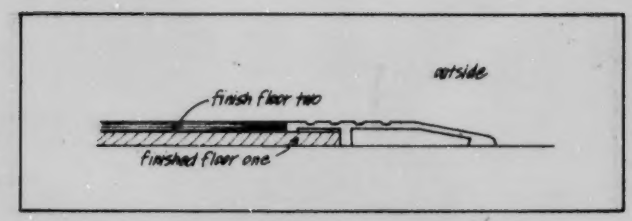


Drawing 23 Special high thresholds may be purchased for high doors or thick carpeting.

SPECIAL HIGH THRESHOLDS are made in a variety of styles and lengths. They are used when the floor has a very thick carpet or when a door has been cut too short (Drawing **23**).

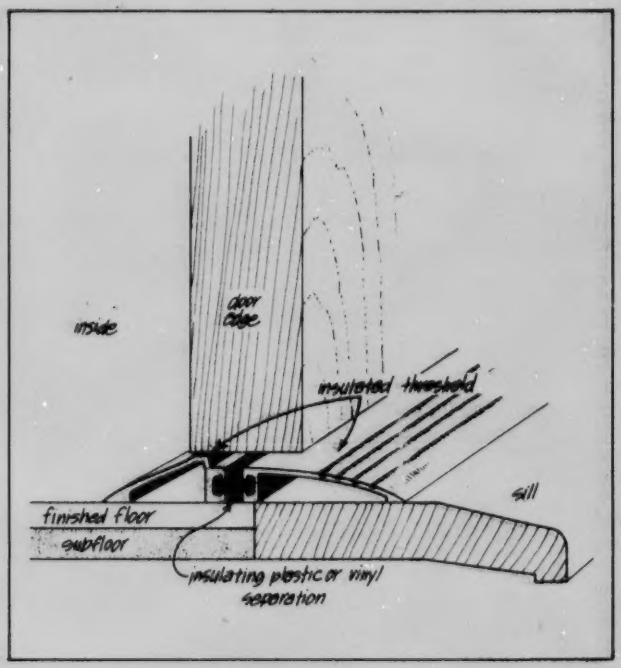
OFFSET THRESHOLDS serve basically the same function as half thresholds. They may be purchased in extruded aluminum of various lengths.

Offset thresholds allow for the use of regular door bottoms and sweeps with uneven floors (Drawing **24**). They are usually more expensive and more durable than half thresholds.



Drawing 24 Offset thresholds are used for uneven floors.

INSULATED THRESHOLDS are special thresholds used in very cold climates. The metal threshold is separated by a plastic gasket (Drawing **25**). This gasket prevents the threshold from conducting heat from the structure. It also prevents moisture from condensing on the interior side of the threshold.



Drawing 25 Insulated thresholds are used in very cold weather.

Tools

The tools required to install weatherstripping depend upon the type of weatherstripping.

Most installations require the following tools:

- Regular screwdriver set
- Phillips screwdriver set
- Hacksaw
- Bastard file
- Scratch awl
- Tin snips
- Scissors
- Sponge and cleaning rags
- Crosscut saw
- 1/2" chisel

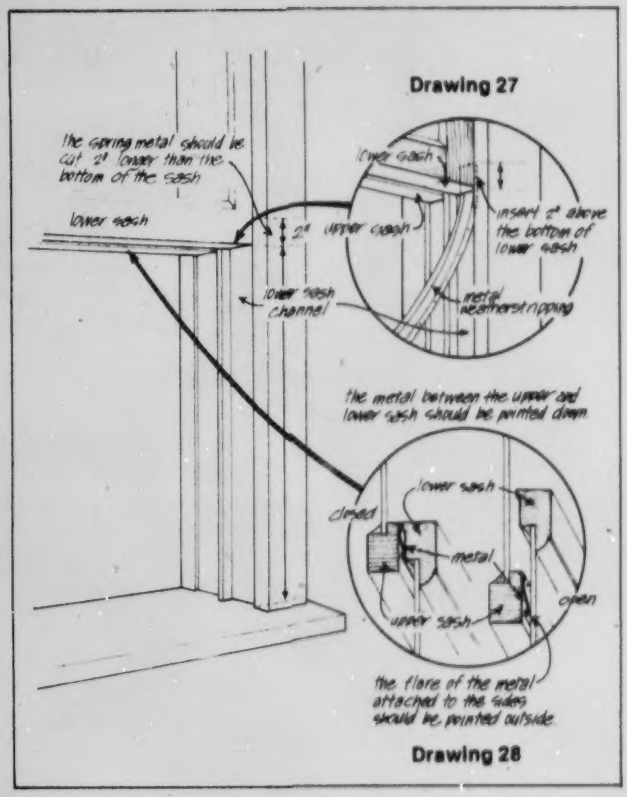
weatherstripping windows

Windows are sources of considerable infiltration in most homes and should be weatherstripped. Windows in older homes almost always require weatherstripping because most:

- Are wooden double-hung windows which allow much infiltration
- Were constructed before manufacturers began to weatherstrip windows
- Have not been properly maintained, are loose-fitting or have dry rot.

Windows in need of repair or that will not open and close properly should be repaired prior to weatherstripping. Once repairs are made jamb weatherstripping can be installed.

The types of jamb weatherstripping most often used are spring metal, pliable gasket, and rigid gasket. In some cases, two types of jamb weatherstripping may be used on the same window. The choice of weatherstripping is usually determined by 1) the size and type window, 2) the appearance of the window, and 3) the type of infiltration problem.


Drawing 27
the spring metal should be cut 2" longer than the bottom of the sash
lower sash
2"
upper sash
lower sash channel
lower sash
insert 2" above the bottom of lower sash
metal weatherstripping
the metal between the upper and lower sash should be pointed down
lower sash
closed
metal
open
upper sash
the flare of the metal attached to the sides should be pointed outside
Drawing 28

Drawing 26 Metal weatherstripping should be cut 2 inches longer than the height of the lower sash.

Double-hung wooden windows

Double-hung wooden windows are usually weatherstripped with spring metal or rigid-gasket weatherstripping. Pliable gasket weatherstripping should be applied only to windows which are rarely opened.

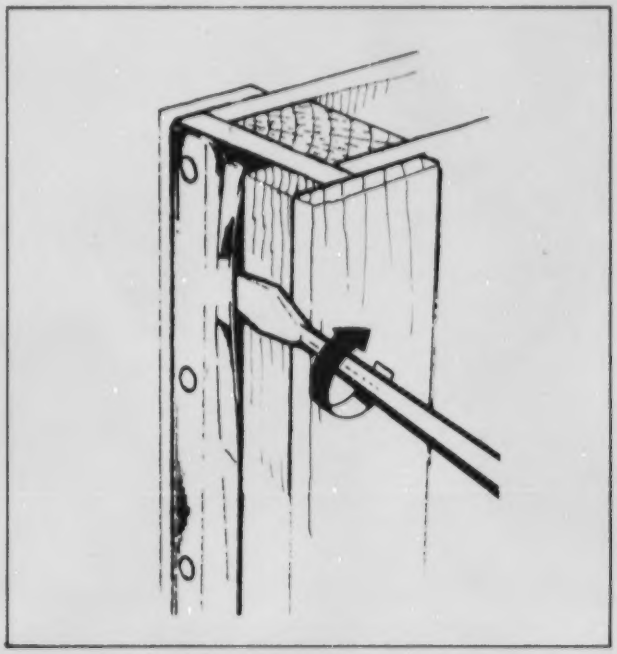
INSTALLING SPRING METAL. Spring metal weatherstripping should be used to replace metal weatherstripping that was factory installed. It requires some skill to install.

The first step is to determine the length of each piece. For vertical pieces, raise the bottom sash as high as it will go, then measure from the bottom of the channel to a point 2" above the bottom rail of the upper sash as shown in Drawing **26**.

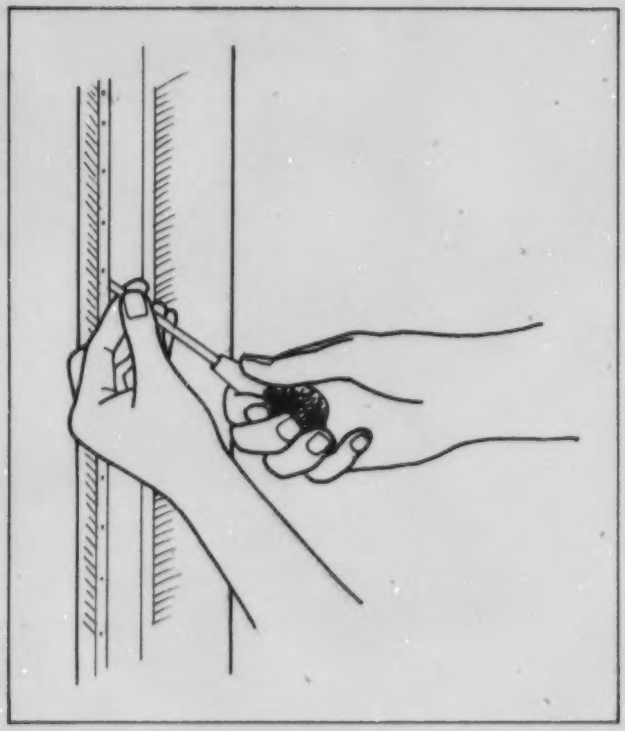
The length of horizontal pieces that fit across the upper and lower sash rails is determined by measuring from side casing to side casing.

After taking the correct measurements, use tin snips or a hack saw to cut the spring metal to the required length as shown in Drawings **39A** and **39B**. Corners should be mitered where required. Follow the procedure below to complete the installation.

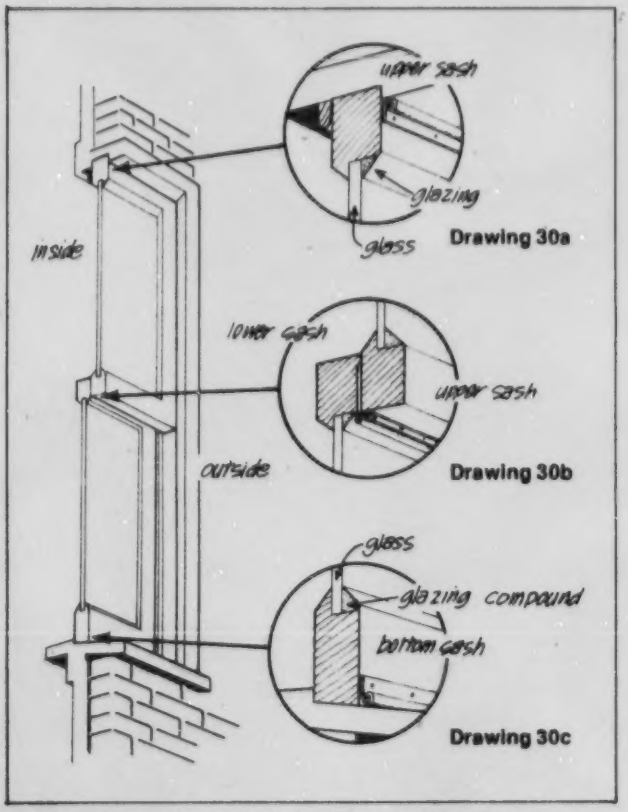
1. Position the vertical piece so that the flare faces toward the outside of the structure.
2. Slide the vertical piece into the lower sash channel as shown in Drawing **27**. The area may need sanding or cleaning with a chisel.
3. Trim metal away from locks, hinges or other hardware.
4. Tack the strip temporarily in place with a nail. Hammer the nail into the center of the strip. An awl may be used to punch a nail hole in the metal strip.
5. Check to be sure the strip is straight and in proper position before nailing the exposed part.
6. Close the window and nail the upper part.
7. Mount the horizontal piece to the upper sash with the flares pointed down and outward (Drawing **28**).
8. Raise and lower the window to check for proper fit and seal. Flare out the edge of the metal strip with a screwdriver or awl to obtain a proper seal (Drawings **29A** and **29B**).



Drawing 29a If the metal does not fit snugly, flare the edge of the metal with a screwdriver.



Drawing 29b Flaring metal with an awl.

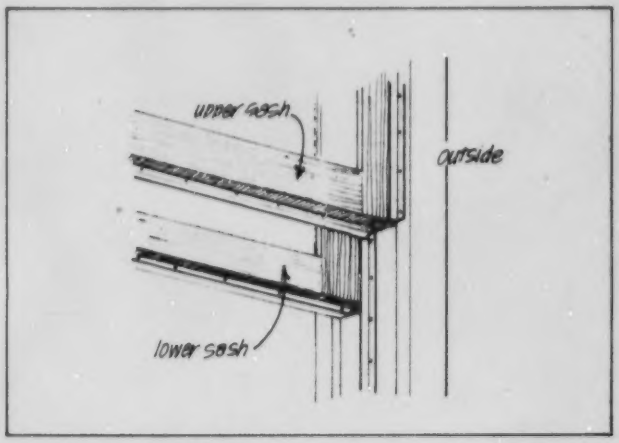


Drawing 30 Installing rigid gasket weatherstripping.

INSTALLING RIGID-GASKET. Rigid-gasket weatherstripping is obtrusive, but provides an excellent seal. It is used in weatherization programs more than metal weatherstripping because it is easier to install and is more durable (Drawings **30** and **31**).

To install rigid-gasket weatherstripping, first measure and cut the strips to length using the same method used for spring metal. Once the pieces are cut, the following procedure is used:

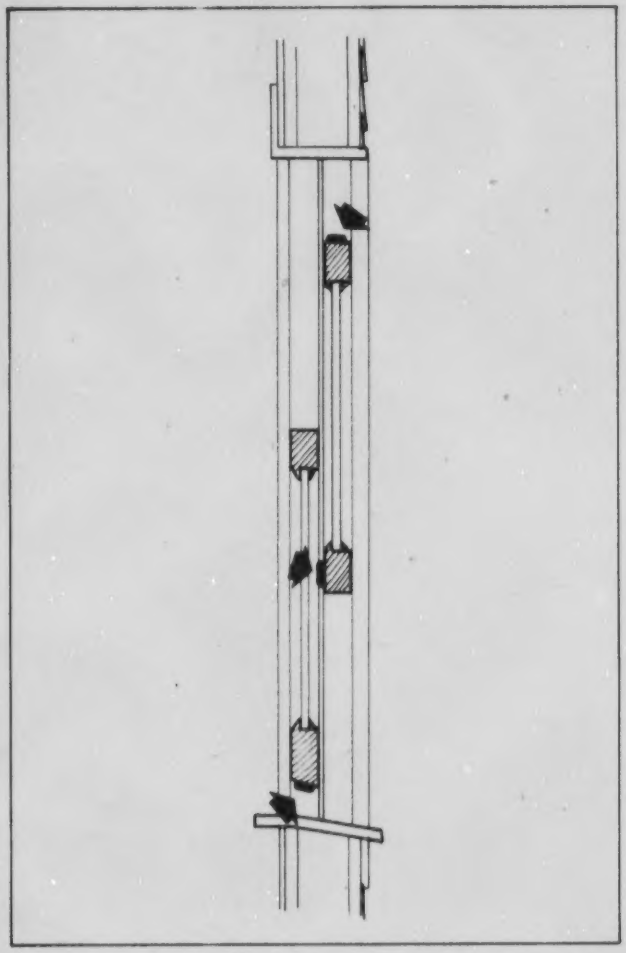
1. Install (nail or screw) side pieces with the gasket compressed lightly against the sash. Do not fit them too tightly because the window will be difficult to open and the vinyl gasket will soon break away.
2. Position and install the top horizontal piece with the gasket pointing up if attached to the sash, and inward if attached to the casing (Drawing **30A**). The bottom piece must be pointed down if attached to the sash, and inward if attached to the sill. The middle piece must be pointed inward and attached to the bottom rail of the top sash (Drawing **30C**).



Drawing 31 Pliable gasket weatherstripping is attached to both the frame and the sash.

INSTALLING ADHESIVE FOAM. Adhesive-backed foam is a pressure sensitive weatherstripping. It is usually purchased in rolls and has a peel-away adhesive covering.

Adhesive foam will wear out quickly if installed on windows that are frequently used. If the window is rarely used, adhesive foam can be placed on the bottom of the lower



Drawing 32 Adhesive-backed foam weatherstripping may be installed on seldom-used windows.

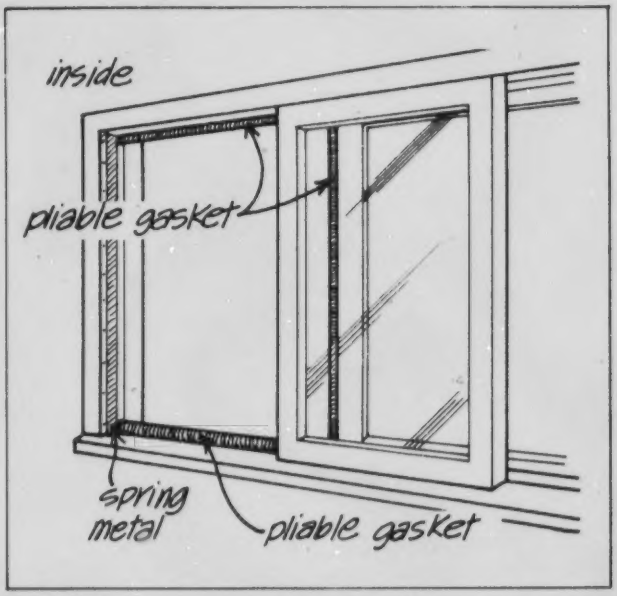
sash, top of the upper sash and on the interior side of the upper sash (Drawing **32**).

To install adhesive-backed foam the following procedure should be used:

1. Clean the sash with a mild detergent and allow the surface to dry.
2. Cut the pieces to length with scissors.
3. Start from one end and slowly push the weatherstripping into position as the adhesive covering is peeled away.

Sliding windows

Sliding windows are made from either wood or aluminum and have laterally moving sashes. They should be weatherstripped the same way as double-hung windows. If only one sash moves, it should be weatherstripped and the other caulked. A properly

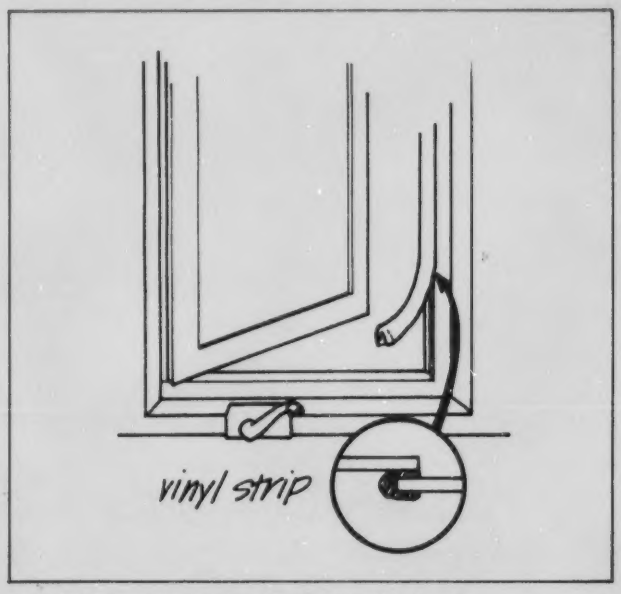


Drawing 33

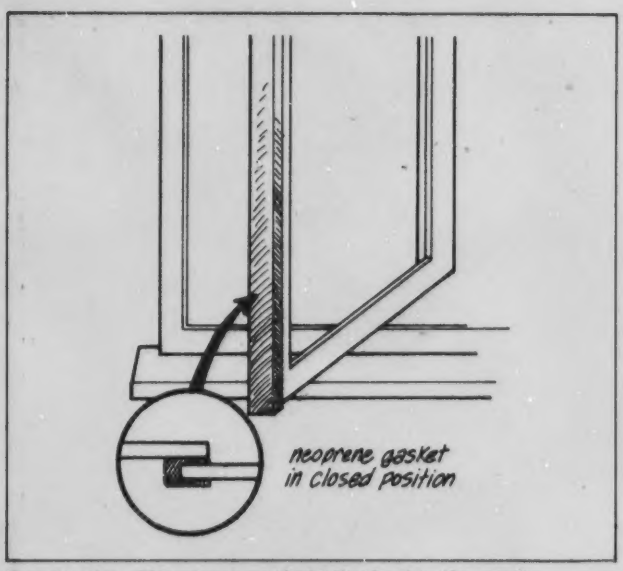
weatherstripped sliding window is shown in Drawing **33**.

Casement windows

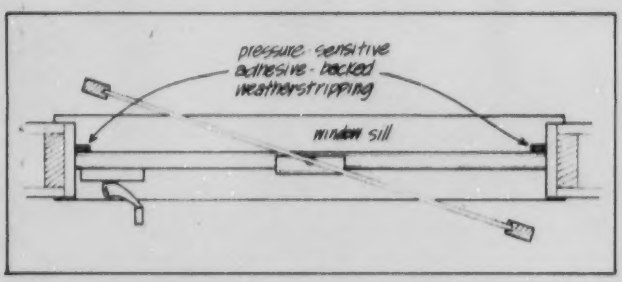
Wood and metal casement may be easily weatherstripped. Special gaskets are available for metal sash casement windows. Most weatherstripping for metal casement windows is placed on the metal frame as shown in Drawing **34**. Weatherstripping is



Drawing 34 Vinyl strip attached to the frame.



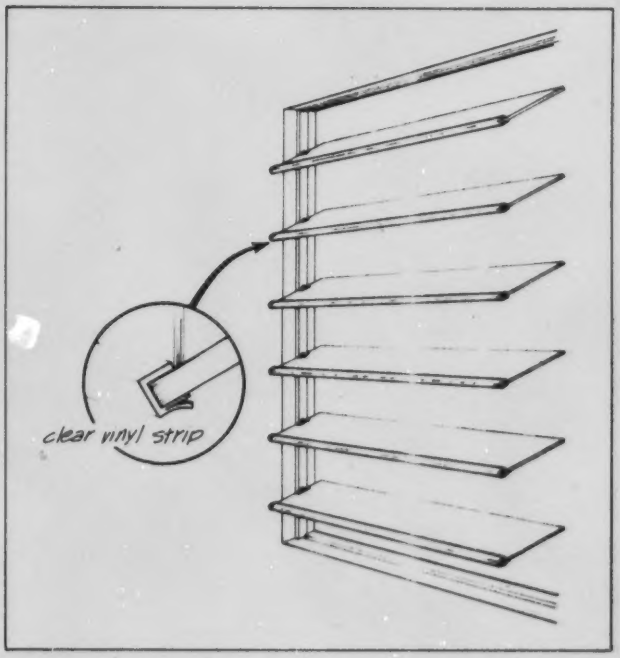
Drawing 35 Neoprene gasket attached to the sash.



Drawing 36 Pressure-sensitive weatherstripping in wooden windows.

also available in sash mounting styles (Drawing **35**).

Pressure-sensitive weatherstripping may be installed on wooden casement windows (Drawing **36**).



Drawing 37 Jalousie windows.

Jalousie windows

Jalousie windows (sometimes referred to as louvered windows) allow more infiltration than most windows. They leak around each pane and require a special vinyl gasket weatherstripping. This weatherstripping is applied to each pane as shown in Drawing **37**.

Jalousie windows will continue to allow some infiltration even after this special gasket is installed to each pane. Storm windows are the only effective way to prevent infiltration through jalousie windows.

weatherstripping doors

Installing door weatherstripping is an easy task. The same tools used for weatherstripping windows are used for weatherstripping doors.

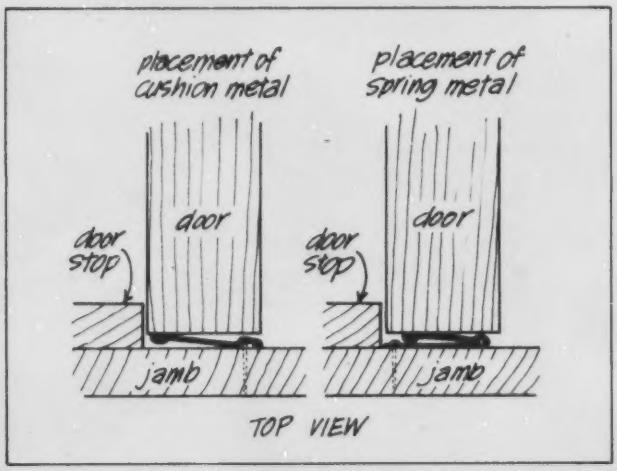
Before starting the weatherstripping process, inspect the door system carefully. Doors are often damaged and weatherstripping alone will not stop infiltration. Check for, and repair, any of the following defects before installing weatherstripping:

- Warping, swelling, or shrinking of wood
- Missing or damaged stops
- Loose hinges and hardware
- Missing or broken glazing
- Missing striker plates
- Delaminated plys

Jamb weatherstripping is the most widely-used door weatherstripping. It is used to seal around the tops and sides of doors. ***Never place jamb weatherstripping on the bottoms of doors.*** Metal, gasket, interlock and adhesive-backed foam can all be used to weatherstrip doors.

Installing spring and cushion metal

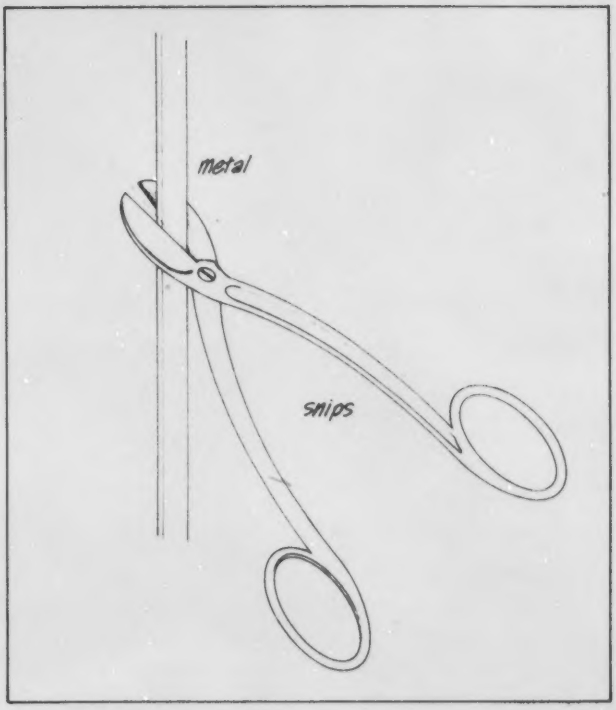
Spring metal and cushion metal are thin flexible metal strips which compress between the closed door and the door jamb as shown in Drawing **38**.



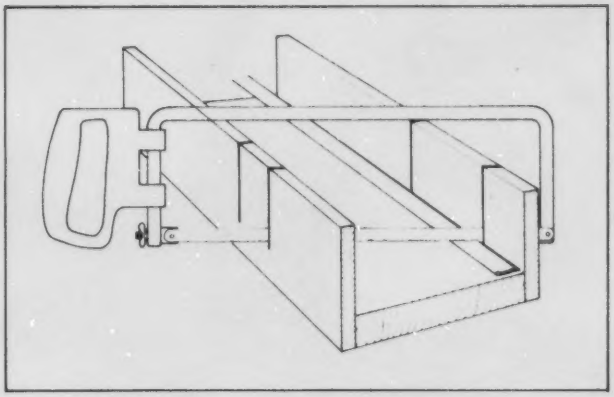
Drawing 38 The metal should almost touch the door stop.

To install metal weatherstripping, determine the length (a zig-zag rule works best) of each vertical piece by measuring from the top casing to the top of the threshold. Next, proceed as follows:

1. Cut each piece to length using tin snips or a miter box as shown in Drawings **39A** and **39B**.
2. If spring metal is used, position the pieces so that the nailing edge almost touches the door stop. If cushion metal is used, position it so the long leg of the piece butts against the edge of the stop.
3. Nail the pieces into position starting on the hinge edge of the door.
4. Tack the metal piece into position by hammering a nail half-way in at the top and bottom. Use an awl to punch nail holes in the metal.

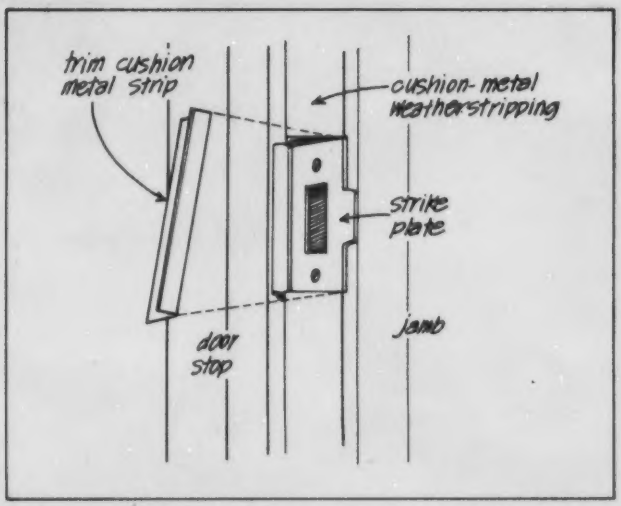


Drawing 39a



Drawing 39b

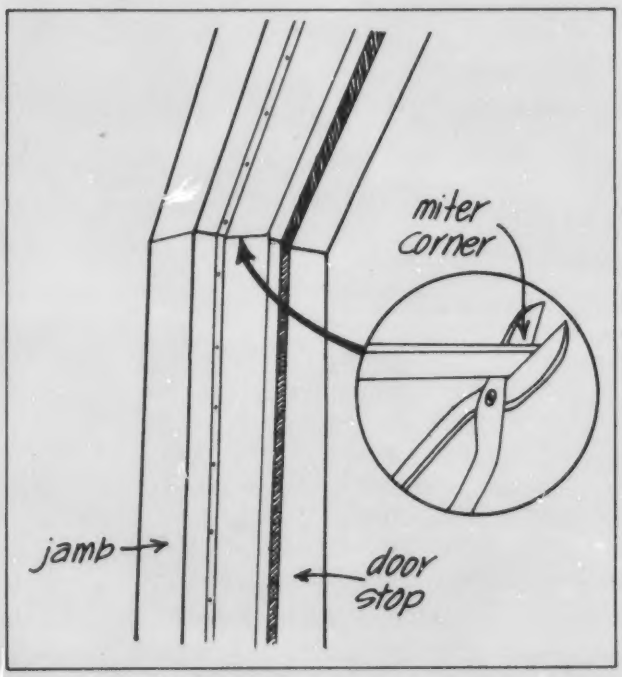
5. After checking the position of the metal, complete the nailing by starting in the center. Nails should be spaced a minimum of 4″ apart.
6. Next, cut and install the pieces on the lock edge of the doorway.
7. Remove any part of the metal that interferes with the striker or other hardware. It may be easier to weatherstrip the lock side of the door by installing the metal in three pieces: one above the striker plate, one below the striker plate, and one short



Drawing 40 Metal should be trimmed around the strike plate and other door hardware.

piece behind the striker (Drawing **40**).

8. Once the side pieces are attached, cut and install the top piece. Miter the corners to insure that the sides seal properly (Drawing **41**).
9. Open and close the door to check for proper fit and seal. Flare out the edge of the metal strip with a screwdriver or awl to obtain the proper seal (Drawings **29A** and **29B**).

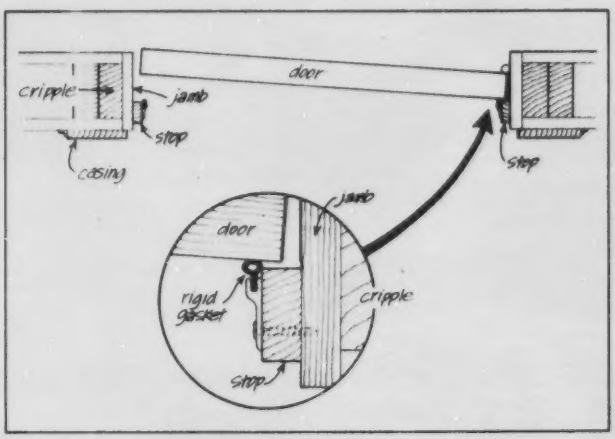


Drawing 41 Miter corners of top piece.

Installing rigid-gasket

Rigid-gasket is recommended for most door weatherstripping. It is durable, easy-to-install, and provides an excellent seal against infiltration. Rigid-gasket should be installed in the following steps:

1. Measure and cut the side strips to length. The strips may be cut with tin snips or a hacksaw. File off the sharp edges.
2. Nail or screw the side pieces to the door stops as shown in Drawing **42**. The gasket must be compressed lightly against the closed door. The side pieces should extend from the top casing to the threshold.
3. Install the top piece. It may require a miter/notch cut for best results.
4. Open and close the door several times to check for proper seal and fit.
5. Check to make sure the dead bolt catches the striker plate.

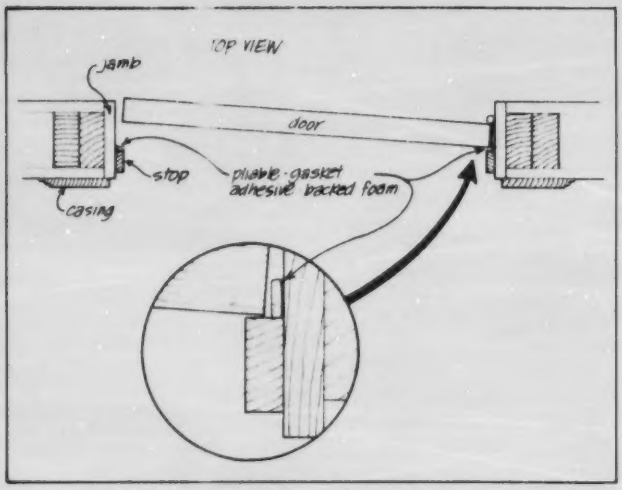


Drawing 42 Top view of door with rigid gasket nailed or screwed into place.

Installing pliable-gasket

Most pliable-gasket is applied the same way rigid-gasket is applied.

Pliable-gasket adhesive-backed foam may be installed on doors which are seldom used. Many homes have three to seven entrance doors. Some are seldom used, but are not nailed shut because of fire. These doors should be weatherstripped with adhesive-backed foam; it is quick, economical, and effective.

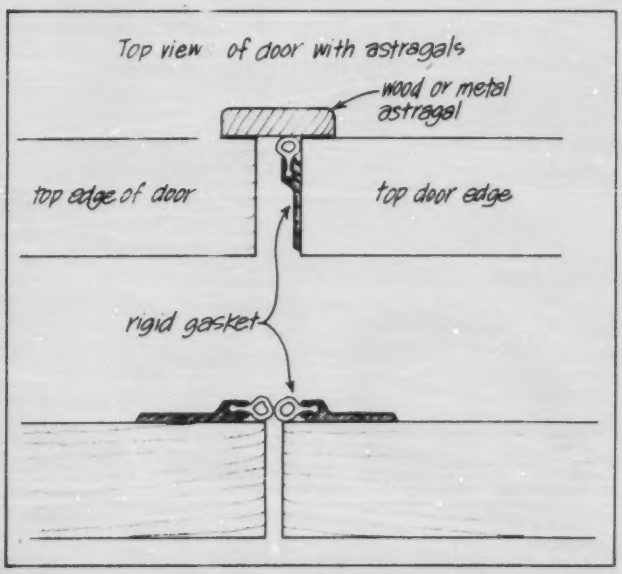


Drawing 43 Top view of door with adhesive backed foam door weatherstripping in place.

To install adhesive-backed foam on doors proceed as follows:

1. Remove any old weatherstripping and clean the surface with a mild detergent. Allow the surface to dry.
2. Measure and cut the pieces to length with scissors.
3. Apply the top piece first. Start on one end and gradually peel away the backing paper while pushing the foam into position.
4. Use the same procedure (steps **1–3**) to install the side strips.

Drawing 44



Drawing 45

Shown in Drawing **43** are locations where pliable gaskets should be used.

Weatherstripping double doors

Double doors may be weatherstripped with metal, rigid-gasket or pliable gasket.

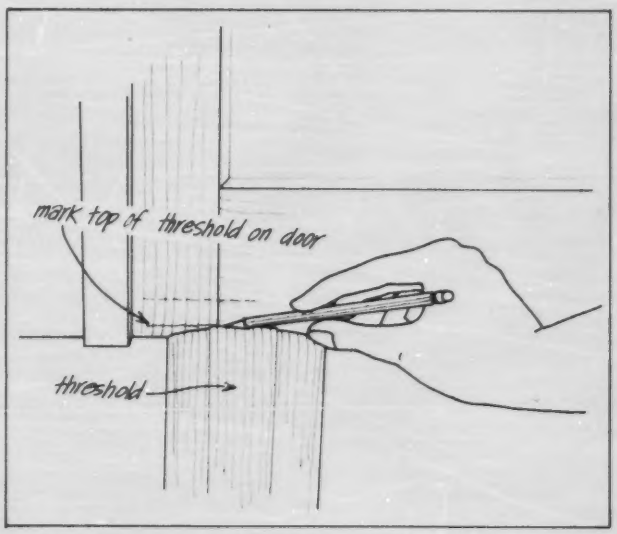
Metal or pliable gasket weatherstripping can be used on doors with astragals (Drawing **44**). When nailing weatherstripping to astragals, support should be provided behind the astragals.

Rigid-gasket can be used on doors without astragals as shown in Drawing **45**.

Installing thresholds

Thresholds are wood or metal door members that attach to the floor under the door. All types are installed basically the same way.

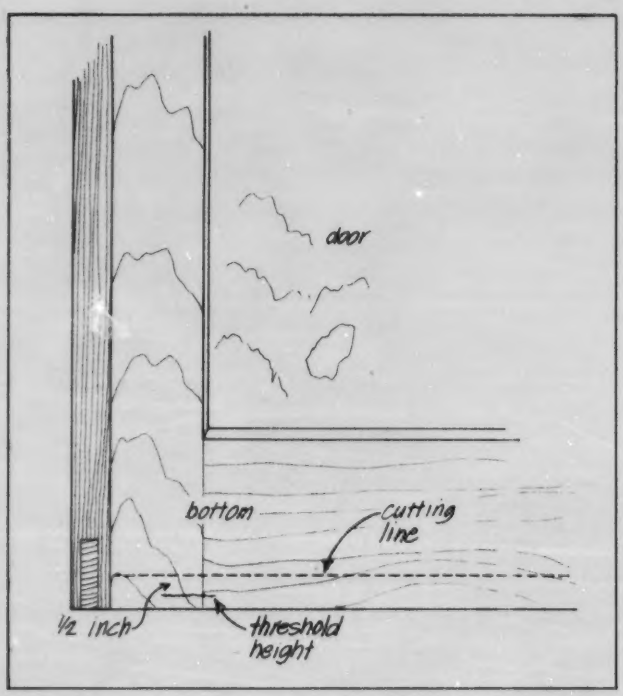
In most cases the old threshold must be removed before the new threshold can be installed. Frequently, the door must be cut or planed slightly to allow room for the new threshold.



Drawing 46 Threshold height may be determined by butting threshold against door and marking.

WOOD SADDLES. Remove the old threshold and install a wood saddle by using the procedure below:

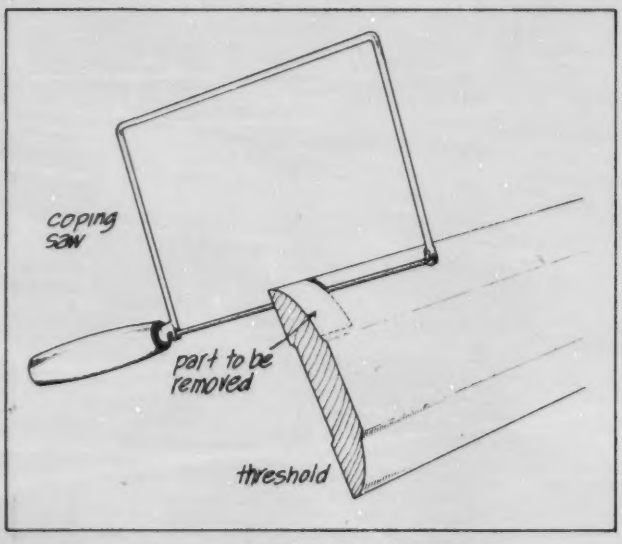
1. Place the threshold under the door to check for proper clearance (1/2" clearance is suggested when door bottoms are to be



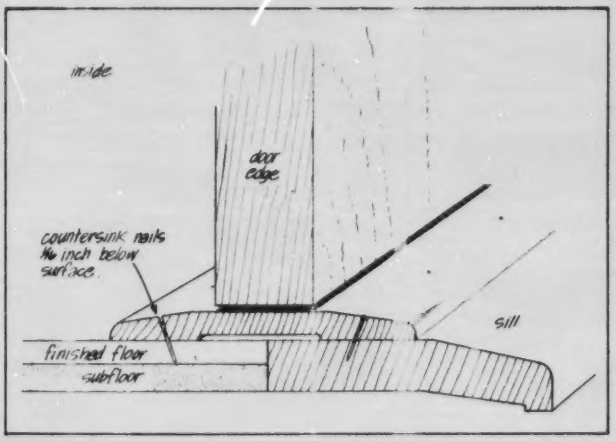
Drawing 47 The cutting line should be marked ½-inch above the threshold height.

used). The door must be cut-off if the threshold will not slide under the door. If the threshold slides under the door, but the gap is less than 3/16", the door should be trimmed. Skip step 2 if the gap between door and threshold is adequate.

2. Measure the amount to be removed by butting the end of the threshold against each edge of the door. Mark the door level with the top of the threshold (Drawing **46**). Next, measure 1/2" above the two marks and scribe the cutting line (Drawing **47**).
3. Determine the threshold length by measuring from jamb to jamb.
4. Cut the threshold to length.
5. Notch the threshold to fit snugly around the door stops and between the jambs (Drawing **48**).
6. Place the threshold in position to substitute if it fits properly. ***Do not force the jambs apart*** when positioning the threshold. Trim the threshold if necessary.
7. Caulk the bottom side of the threshold before installing.
8. Place the threshold in the permanent position and predrill the nail holes.
9. Nail the threshold into position with finish nails. Set all nails 1/2" below the surface (Drawing **49**).
10. Place wood filler over nail heads.
11. Sand lightly and finish with a varnish or plastic finish.



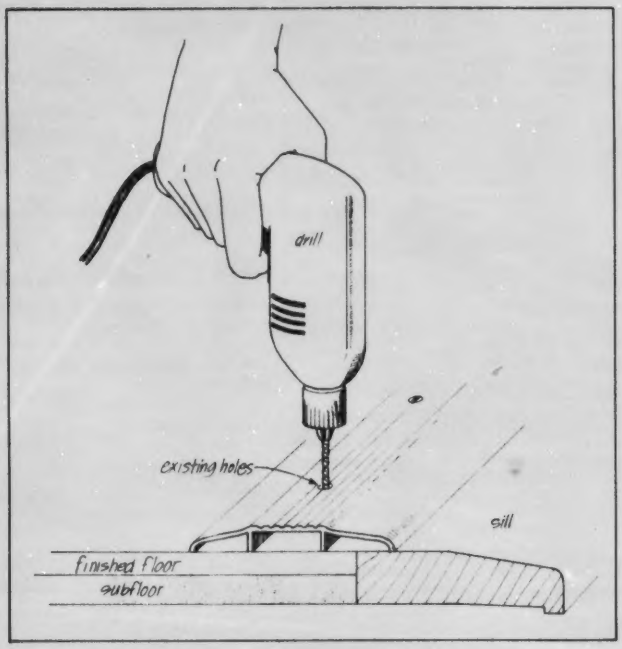
Drawing 48 Trimming threshold with coping saw.



Drawing 49 Center threshold below closed door and nail through beveled edges on both sides.

METAL SADDLES. Metal thresholds are installed using the same procedure outlined for wood thresholds. A hacksaw is required and screws, rather than nails, are used for assembly.

Screw holes are already present in metal thresholds, but the sill and subfloor may require the drilling of pilot holes to prevent



Drawing 50 Pilot drilling of screw holes prevents screws from twisting or breaking.

screws from twisting and breaking (Drawing **50**).

GASKET SADDLES. Gasket saddles are installed similarly to metal and wood saddles. For best results, the door should be cut at a 1/8" bevel as shown in Drawing **51**. The angle may be cut with a portable circular saw or table saw.

Care should be exercised when cutting the door. If too much is removed, the gasket will not create an effective seal. If too little is removed, the gasket will press too tightly against the door and will soon wear out.

INTERLOCKING THRESHOLDS. Interlocking thresholds may be installed by using the same procedure used for installing saddles. As shown in Drawing **52**, the hook strip must be mounted on the interior side of the door. The base is installed first and the hook strip attached with the door in closed position.

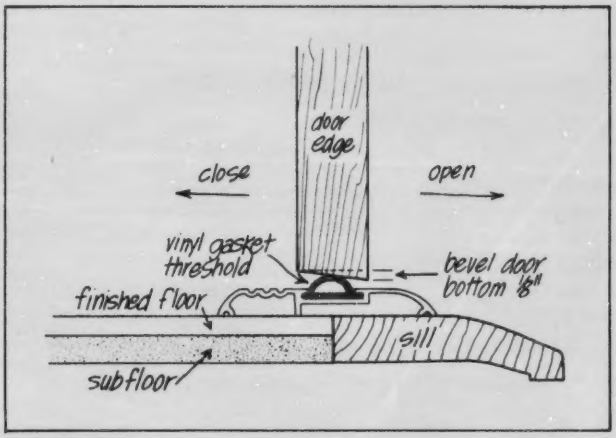
Installing door bottoms

Door bottoms attach to the bottom of the door and press against the threshold to create an effective seal against infiltration.

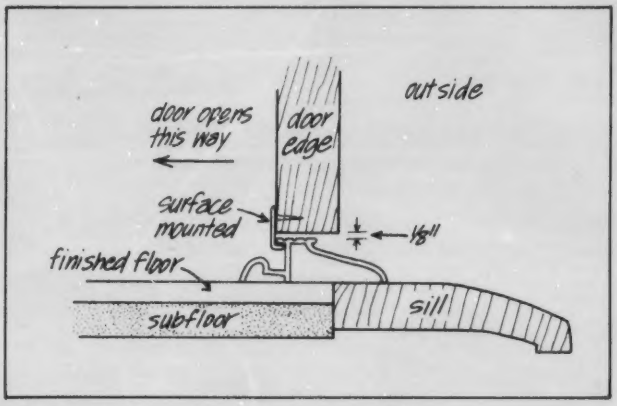
Discussed below are three types of door bottoms used to prevent infiltration: door sweeps, door shoes and automatic door bottoms.

DOOR SWEEPS. Door Sweeps are the most often used door bottoms in the weatherization program and are very simple to install. They should not be used on doorways where the threshold is less than 1/2" above the floor covering. They may be installed as follows:

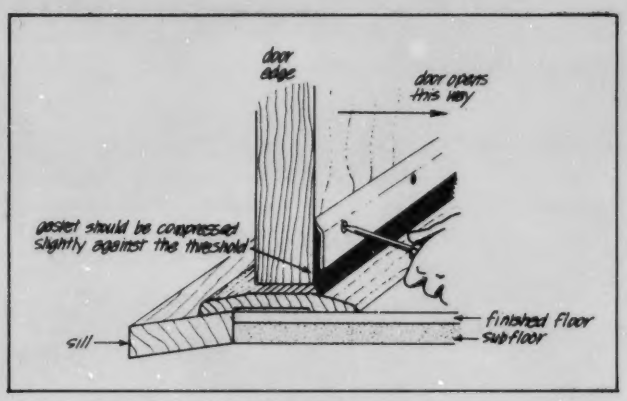
1. Determine the length of the sweep by measuring the distance between the jambs.
2. Cut the sweep to length with a hacksaw. Remove burrs left on the sweep with a file; it may be necessary to cut each end so the end screw holes will be spaced evenly from each edge of the door.
3. With the door closed, position the sweep so the gasket is lightly compressed on the threshold (Drawing **53**).



Drawing 51



Drawing 52

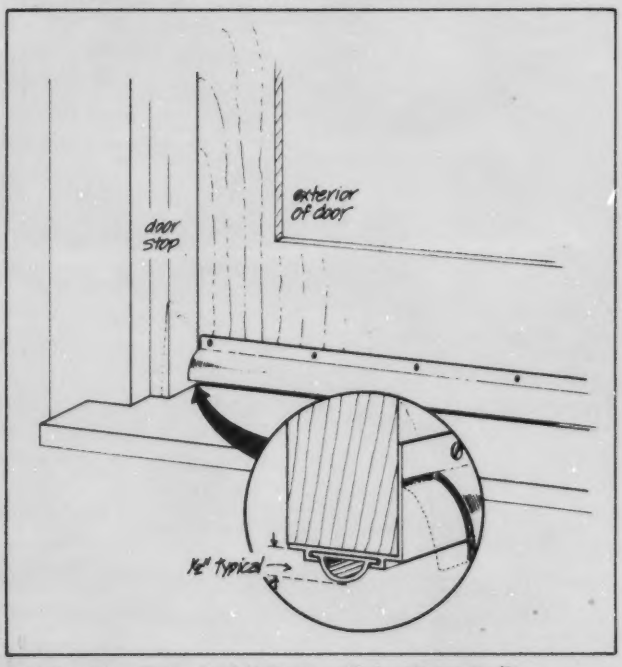


Drawing 53 Installing a door sweep.

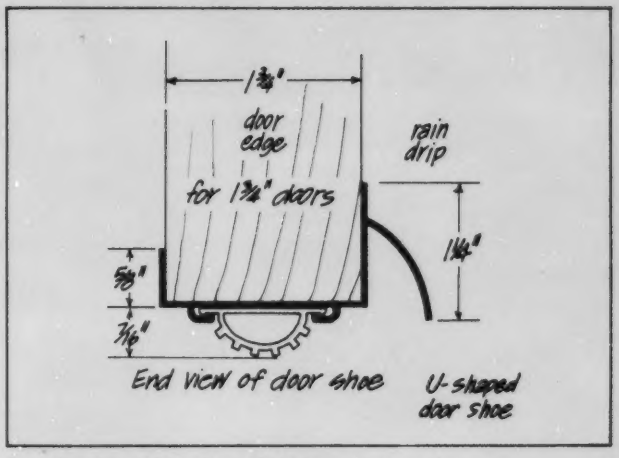
4. Mark the holes with an awl and insert two screws. In some cases, especially with hardwood and metal, pilot holes will need to be drilled.
5. Open and close the door several times to check the seal and fit before inserting the remaining screws.

DOOR SHOES. Both U-type L-type door shoes are installed using the following procedure:

1. Measure for length from jamb to jamb.
2. Cut the shoe to length with a hacksaw. It may be necessary to cut from both ends so the screws will be evenly spaced on each end.
3. If a combination door shoe and rain drip is used cut the rain drip back enough to clear the door stop (Drawing **54**).
4. Position the shoe on the door with the gasket lightly compressed against the threshold (Drawing **55**). Remove and trim the door if the gasket is compressed too tightly.
5. Mark and punch each hole with an awl.
6. Attach one screw on each end and check for proper fit and seal. Make the necessary adjustments and insert the remainder of the screws. Drill pilot holes for the screws if the door is made of hardwood or metal.



Drawing 54 Cut rain drip back with hacksaw to fit between door stops.



Drawing 55 Side view of U-shaped door shoe.

AUTOMATIC DOOR BOTTOMS. Automatic door bottoms are installed using a procedure similar to door sweeps:

First cut automatic door bottoms to fit between jambs. Do not cut the end with the bumper button (Drawing **56**). The sweep should be in the extended position when cutting. It may be held in this position with a small pin or nail. Automatic bottoms must be cut very carefully to prevent damaging the mechanism.

Next attach the automatic bottom to the door by using the following procedure:

1. Position the bottom so that the gasket is lightly compressed against the threshold when fully extended.
2. Mark and punch the screw holes with an awl.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Add plastic/solar screen window covering

PERFORMANCE OBJECTIVE: Given access to a window, plastic/solar screen covering, scissors, masking/duct tape, wooden slats, exacto-knife, tape measure, hammer and tacks, add plastic/solar screen covering. Covering will be cut evenly, stretched smoothly over window, attached tightly and securely and will extend full length and width of window beyond all movable parts.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: "Weatherize Your Home/Storm Windows" - Genta S. Speakman, Alabama Cooperative Extension Service, Auburn University - Circular HE-384.

Other Resources: "Rescreening The Easy Way" (alternate method of application included with solar screening when purchased)

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Discuss need for adding plastic/solar screen window covering
- Discuss how storm windows save energy
- Display pictures of houses with plastic/solar screen window covering
- Display materials used for performance of task
- State objective and present overview of lesson

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble equipment and materials	. Discuss use of equipment and materials	. Tape measure . Scissors . Plastic film - 6 or 12 mil . Solar screen . Tacks/masking tape . Hammer . Wooden slats
2. Measure window . Interior/exterior . Add 2 inches to all sides	. Provide students with a handout on instructions for adding window covering . Demonstrate measuring and recording measurements . Plan for students to measure and determine size of window	. Handout - "Storm Windows and Storm Doors" . Tape measure/ruler
3. Determine amount of plastic film needed	. Calculate amount of plastic film needed for window	
4. Cut plastic film to desired size	. Demonstrate cutting plastic film evenly, 2" longer and wider than assigned window, for taping and reinforcing.	
5. Tape plastic film to window . Masking/duct tape . Tight and secure	. Demonstrate adding tape	
6. Tack wooden slat over tape (outside application)	. Demonstrate procedure	
7. Remove excess film with exacto knife.	. Demonstrate procedure	

IV. SUMMARY: (Review main points, draw conclusions)

- Measurement of windows
- Determining amount of plastic film/solar screen needed
- Cutting plastic film/solar screen
- Adding plastic film/solar screen to windows.
- Trimming excess plastic film/solar screen

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

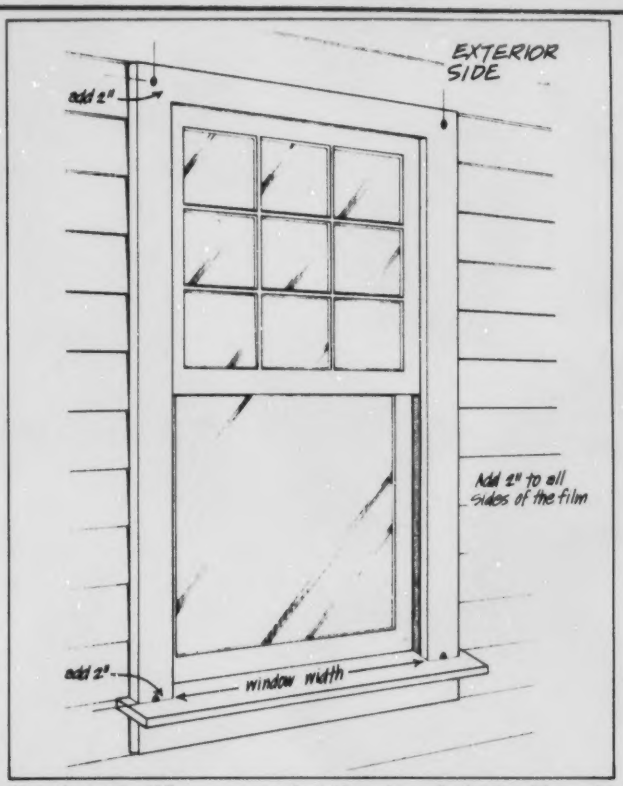
- Given access to a window, plastic/solar screen covering, scissors, masking/duct tape, wooden slats, exacto-knife, tape measure, hammer and tacks, add plastic/solar screen covering. Covering will be cut evenly, stretched smoothly over window, attached tightly and securely and will extend full length and width of window beyond all movable parts.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

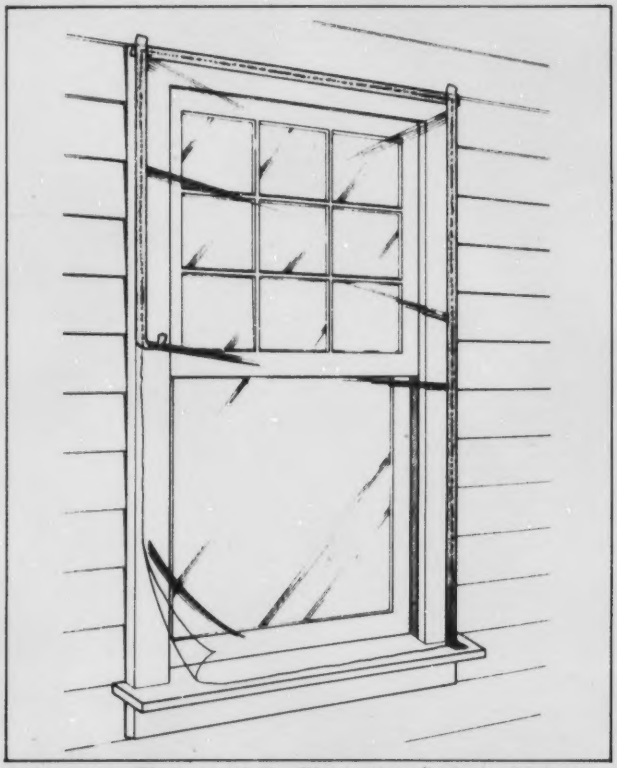
- Plan FHA project to add plastic film on windows for needy/elderly family

constructing storm windows

Drawing 15 Interior storm windows may be constructed with a plastic film and tape.



Drawing 16 When measuring the size of plastic film add 2 inches to all sides.



Drawing 17 First attach the film to the window with tape.

TOOLS. The only tools needed to install a permanent film window are shears, hammer and a heavy-duty stapler.

MATERIALS. Six-mil polyethylene film may be used, but is not recommended. Twelve-mil U.V.-treated film is recommended because of its durability.

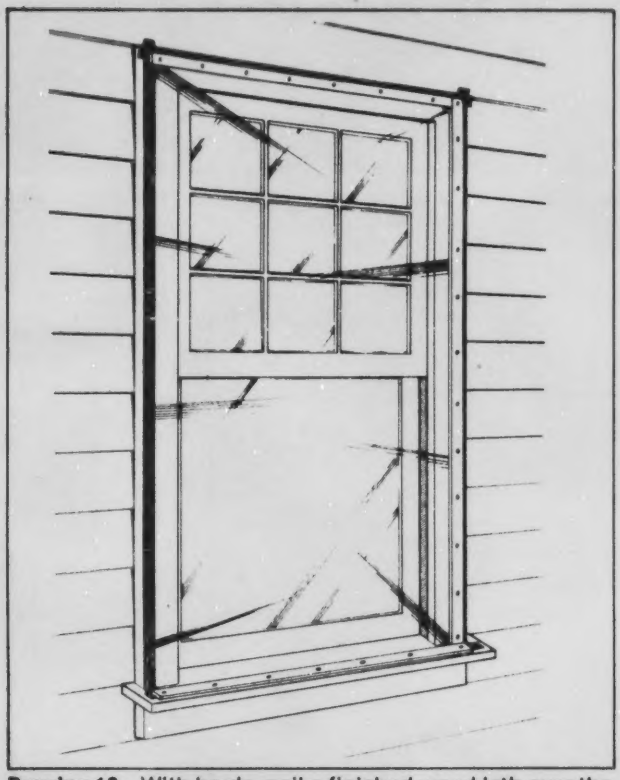
Other items needed are:

- 2" wide masking tape
- 1/4" x 1/2" wood slats
- Wire brads and staples

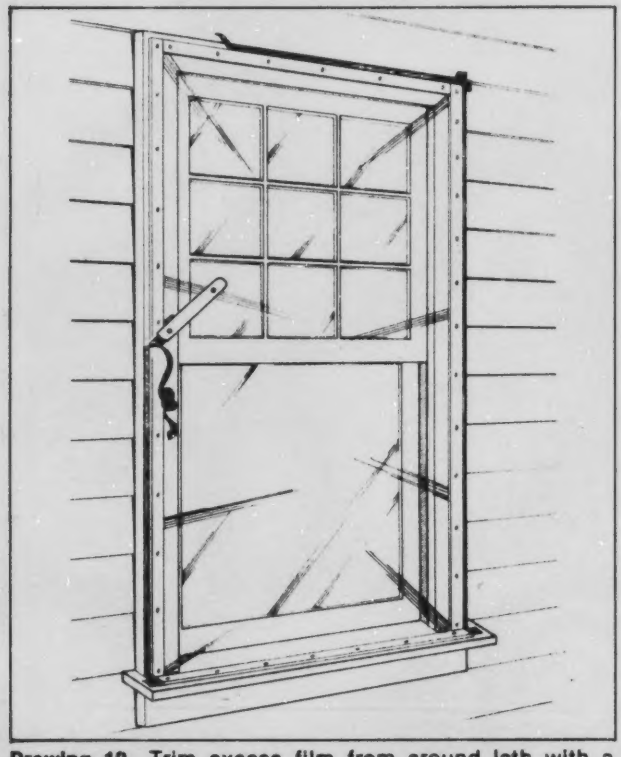
PROCEDURE. When applying plastic film on windows, try to place the film so the space between the film and the glazing of the primary window is 1/2" to 1" wide.

To install the film on the exterior:

1. Measure the size of the window, adding a minimum of 2" on each side for taping (Drawing **16**).
2. Cut film to desired size.
3. Tape film to window with masking tape (Drawing **17**).



Drawing 18 With brads, nail a finished wood lath over the tape.

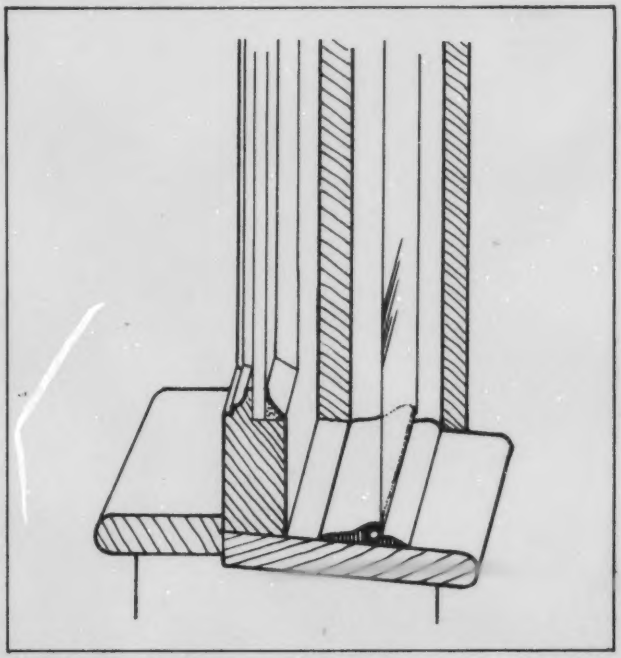


Drawing 19 Trim excess film from around lath with a sharp knife.

4. Nail a thin wooden slat over the tape for reinforcement (Drawing **18**).
5. Remove excessive film with exacto-knife (Drawing **19**).

When placing film on the interior of the window, use the same procedure, with the exception of step 4.

Commercial storm window systems are also available. They are installed on the casing near the exterior facing as shown in Drawing **20**.



Drawing 20 A more expensive 12-mil film and rigid PVC vinyl framing system may be used instead of the film and wood lath.

Removable film storm windows

Plastic film storm windows may be constructed so that they are removable and interchangeable with window screens. Removable film storm windows have the same disadvantages as permanent film windows.

Removable film storm windows are usually placed on the exterior.

TOOLS. The tools needed to construct a removable film storm window of wood are:

- Shears
- Hammer
- Stapler
- Miter box and saw

MATERIALS. As with permanent film storm windows, six-mil polyethylene film may be used, but is not recommended. Twelve-mil, U.V.-treated film is recommended because it will last much longer.

For the frame, vinyl, aluminum, or wood can be used. Aluminum is recommended because of its durability and maintenance-free characteristics. A heavy gauge anodized or baked-on enamel finish frame stock is recommended. Cheaper, unfinished aluminum will oxidize and pit. The frame stock should include a good sealing system (bead).

Wood is used in many weatherization programs. Wood may be less expensive than aluminum if purchased in wide stock and cut to size, but when ordered to size, it is often as expensive as aluminum and vinyl.

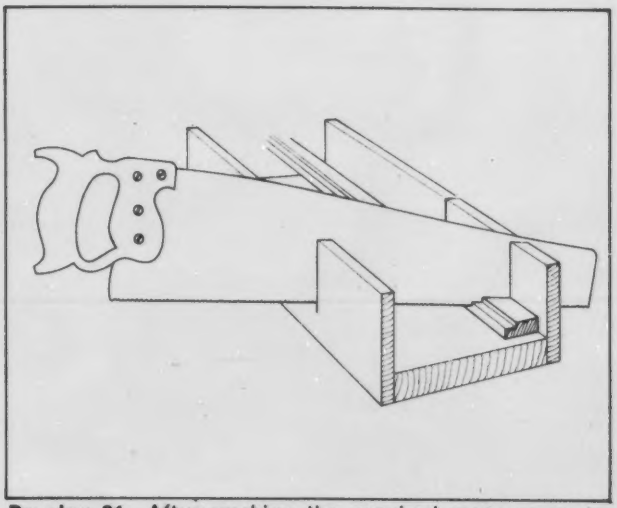
All three framings may be purchased in various designs and styles, the simplest being a standard 1″ x 2″ grooved wooden board.

The following materials are needed to construct a removable film storm window with wood:

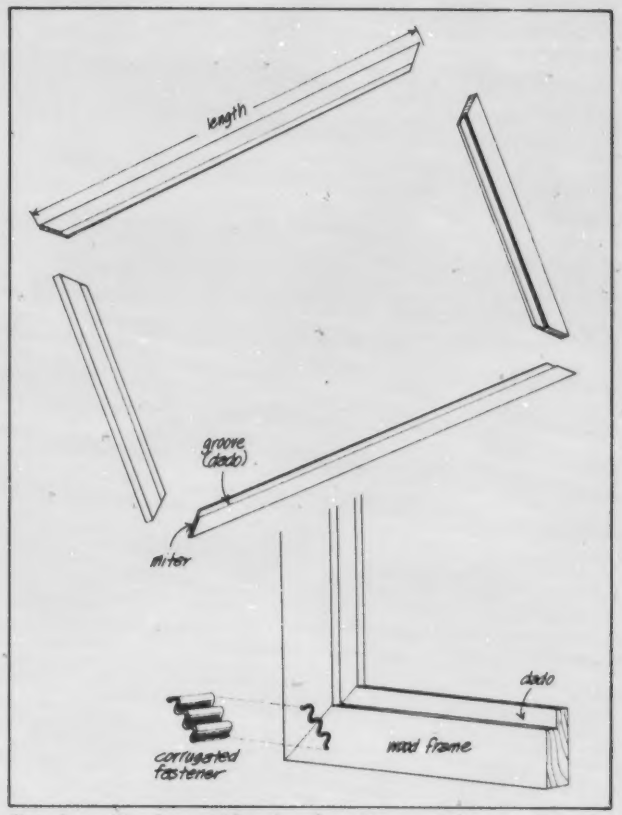
- 1″ x 2″ framing
- Screen lath
- Corrugated fasteners
- Wire brads
- Wing nuts and screws
- 1″ foam adhesive-backed weatherstripping

PROCEDURE. The first step is to measure the length and width of the area for the storm window. The storm window should be placed on the outside stops or on the window casing. It should be at least 1/2″ from the primary window glazing. Once the measurements have been made, the following procedure is used:

1. Cut one end of each framing member off at a 45° angle, using the miter box saw as shown in Drawing **21**.
2. Cut each member to length. Make each measurement from the long edge of the 45° angle.
3. Assemble the frame with corrugated fasteners or corner braces (Drawing **22**).
4. Finish each framing member (paint or wood preserver).
5. Staple the film to the frame inside of the dado (groove).

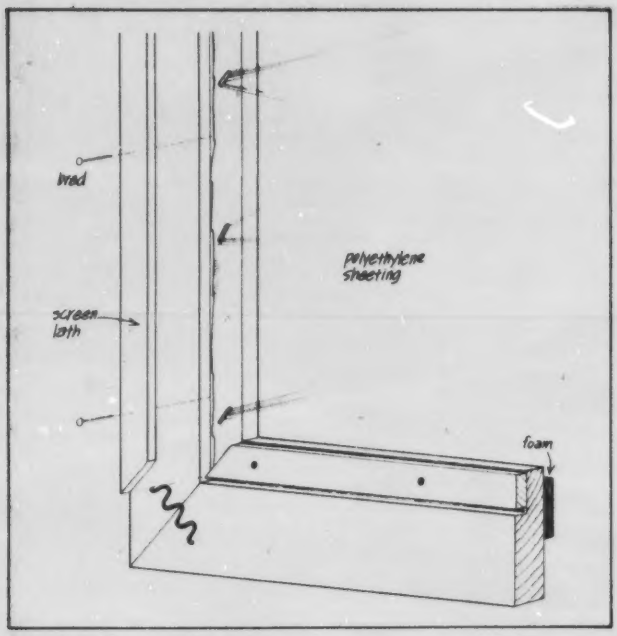


Drawing 21 After marking the required measurements, cut each of the four framing members to length. Measurements should be made from the long side of the 45° angle.

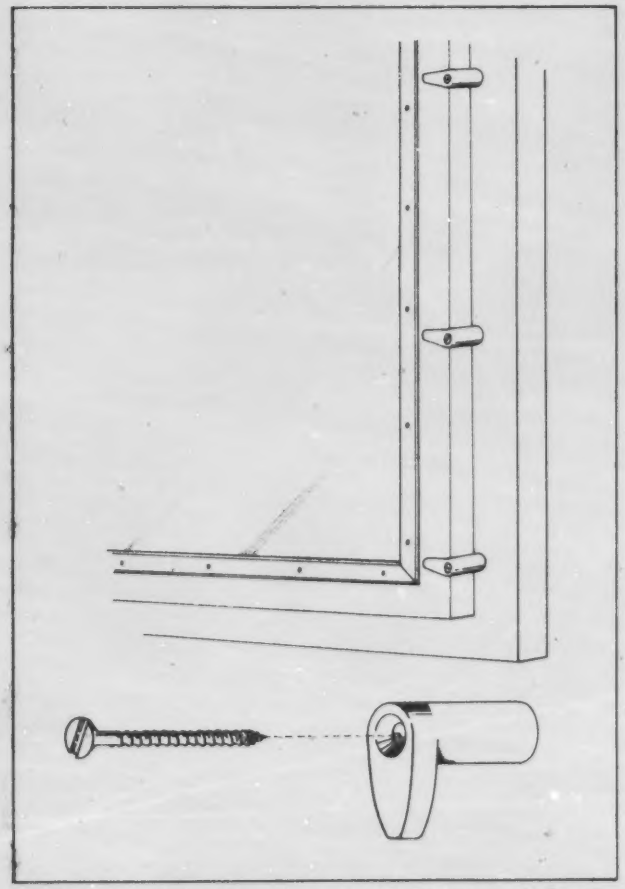


Drawing 22 Assemble the framing members with corrugated fasteners.

6. Reinforce the staples by mounting screen lath over the stapled edges. Cut the lath neatly with a miter box saw and nail it in place with wire brads (Drawing **23**).



Drawing 23



Drawing 24 With wingnuts, mount the storm window to the primary window unit.

7. On the backside of the frame, mount the foam weatherstripping (Drawing **23**).
8. Mount the frame in position with wing nuts or lugs (Drawing **24**).

Permanent single-paned storm windows

Single-pane storm windows made with acrylic or glass are far superior to plastic film storm windows. They may be purchased ready-made or constructed by the weatherization crew. No special skills are required for single-pane construction.

Single-pane storm windows may be used for more than one season and can be replaced with window screens. However, they cannot be opened for ventilation and may be dangerous in the event of a fire if a window escape is necessary.

The single-pane window may be mounted on either the inside or outside of the window. Some types have velcro or double-backed adhesive foam mounted on the back of the frame and can be pressed into place.

TOOLS. A table saw with an aluminum blade can be used to cut the aluminum frame stock or a miter box and hacksaw can be used. The additional tools needed are:

- Crosscut handsaw
- Hammer
- Utility knife or razor blade
- Bastard file

MATERIALS. The glazing of single-pane windows should be acrylic sheet or glass. U.V.-treated acrylic sheets are adequate for seasonal use. However, glass is recommended for seasonal and year-round use.

The frame may be constructed of wood, plastic, steel, or aluminum (Drawing **25**). Aluminum is best because of its durability and maintenance-free characteristics. The heavier the gauge of the aluminum, the sturdier the window unit. Anodized or baked-on enamel finished frame stock is recommended. Cheaper, unfinished aluminum will oxidize and pit. The frame stock should include a good sealing system to prevent infiltration.

Other materials needed are 2" masking tape and adhesive-backed foam weatherstripping.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Arrange furniture for saving energy.

PERFORMANCE OBJECTIVE: Given furniture and room models, sketch furniture arrangement to conserve energy. The placement of furniture must add insulative value and prevent the obstruction of the heating and cooling system.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: Energy Fact Sheet - "Conserve Energy -- as You Decorate", Kentucky Cooperative Extension Service.

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Emphasize the value of arranging furniture to conserve energy,
- Handout - "Conserve Energy -- as You Decorate."
- Transparency of room sketch with overlays (1) Diagram of hot and/or cold air registers or intake vents (2) Furniture arrangements.
- State objective and give overview of lesson.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble furniture models and room sketches.	. Display furniture models and room sketches. . Discuss use of furniture models and sketches to simulate placement of furniture to conserve energy.	. Furniture models . Room sketches
2. Placement of furniture . Add insulative value when placed along exterior walls . Wall units . Shelves . Storage units . Cabinets . Prevent obstruction of the heating and cooling system . Hot or cold air registers . Intake vents . Avoid draft areas . Seating areas . Beds	. Discuss placement of furniture to add insulative value and prevent the obstruction of heating and cooling system. . Discuss arrangement of seating areas and beds to avoid draft areas. . Demonstrate placement of furniture to conserve energy. . Direct student to place furniture models on sketch to add insulation, prevent obstruction of heating and cooling system and avoid drafts.	. Handout, "Conserve Energy -- as You Decorate." . Pictures of furniture arrangements . Handout - "Conserve Energy --as You Decorate." . Transparency - Room sketch with overlays. . Furniture models . Room sketches

IV. SUMMARY: (Review main points, draw conclusions)

Emphasize main points of the following as necessary:

- Assemble furniture models and room sketches.
- Placement of furniture.

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Given furniture and room models, sketch furniture arrangement to conserve energy. The placement of furniture must add insulative value and prevent the obstruction of the heating and cooling system.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Direct students to study the furniture arrangements in their home to determine if they aid in conservation of energy. Report findings in class.
- Give preview of next lesson.

ENERGY FACT SHEET

H.E. 6-263

Conserve Energy . . . as you Decorate

UNIVERSITY OF KENTUCKY · COLLEGE OF AGRICULTURE · COOPERATIVE EXTENSION SERVICE
AGRICULTURE · HOME ECONOMICS · 4-H · DEVELOPMENT

Decorating to save energy may require little or no outlay of money. Creating a feeling of warmth or coolness can be as important as actual warmth or coolness.

Winter is the time to use warm colors—reds, oranges, yellows—in all kinds of accessories, including dried flower arrangements, pillows piled on chairs and sofas, chair throws, draperies. Chair throws, particularly on vinyl-covered furniture, create a greater feeling of warmth. Colors such as blue and green tend to make a room "feel" cool. If you want to change color schemes when you redecorate, consider using warm colors for rooms with northern exposures and cool colors for rooms with a western exposure. Slipcovers, furniture throws, and accessories can be varied with the season to give a room the "feeling" you want.

Draw draperies at windows should be closed at night, opened in the daytime when the sun is shining on the windows. Some heat will be saved and the comfort factor is improved. If the heat source is under the window, you might put up draperies apron length and without pleats. The draperies will lay smoothly against the sill when drawn (heat is lost up the inside of the folds of the usual draperies). Also, the draperies should hug the wall on either side of the window. Roller shades may be used for added insulation at windows. In the summer, you may want to use sheer curtains and shades to control light but also allow for good air circulation. Metal or plastic heat deflectors over floor or wall air outlets help control the direction of heated or cooled air.

Weatherstrip and caulk all windows and doors. Sealing up these tiny cracks can greatly increase comfort and save on fuel bills. Use draft dodgers (long, sand-filled cloth tubes) at the base of drafty doors.

Cut down on electrical energy by using only necessary lights, but, do not sacrifice comfort and safety. Replace bulbs in general lighting fixtures with lower wattage bulbs. At the same time, continue to provide quality lighting for seeing tasks, such as studying, reading and sewing. Translucent lampshades with white linings allow light to be reflected and pass through the shade. For seeing tasks, place lamps where they are needed, not three feet away! Dust light bulbs regularly.

If new lighting fixtures are installed, consider fluorescent ones. A 40-watt fluorescent tube gives about as much light as a 100-watt incandescent bulb. The use of warm deluxe white fluorescent tubes instead of the standard cool white ones creates a more pleasing light in any room. Replace the standard cool white tubes in fluorescent fixtures in kitchen and bathroom with warm white deluxe to create a warmer feeling.

Energy conservation in the home can be aided by choosing furniture that increases the insulation of the home; and by choosing space-conserving furniture such as multi-purpose units, folding pieces, or pieces that can be stored until needed. This reduces the interior space needs of the family. The placement of furniture can also add insulative value to the home and prevent the obstruction of the heating and cooling system.

Large multipurpose wall units, shelves, storage units, and cabinets can actually add up to an additional 18 to 24 inches of insulative materials or air when placed along exterior walls. Of course, the less space you have to heat and cool, the less energy it will require. If multipurpose units (such as a sofa-bed) are selected, a sizable reduction in space requirements in the home may be achieved.

Furniture should not block hot or cold air registers, or intake vents. Obstructions reduce the heating and cooling efficiency of the system. Clean or replace furnace and air conditioning filters regularly. Seating areas and beds should not be placed near drafts, since people usually turn up the thermostat when they get cool.

Furniture style and upholstery also affect comfort. Wing chairs are warmer than open arm chairs because they give protection from drafts. In winter, soft fabric upholstery feels warmer than leather, plastic, or wood. A warm-colored slip cover or furniture throw made of soft, fuzzy fabric can be used to cover unupholstered furniture in winter. In summer, furniture of leather, plastic, and wood, which are nonabsorbent materials, tends to feel "sticky" and adds to discomfort. Consider using slip-covers and

furniture throws of smooth, absorbent fabrics.

If you are redecorating, select light colors for walls and draperies which will reflect more light. Paint ceilings white with a matte finish. The use of light colors also creates a feeling of more space, which is a psychological advantage if you are reducing the amount of living space you are heating in winter and cooling in summer. Vinyl wallcoverings, paint, and carpeting with a waterproof backing are beneficial as sealers for ceilings, walls, and floors. They help fill, seal, or cover cracks in a home that allow for air infiltration. Another method for decreasing infiltration is adding interior moldings where walls join ceilings and floors, and around windows.

Interior finishing materials such as wallboard, paneling, paint, flooring, wallpaper, tile, ceiling tile, acoustical tile, and carpeting are usually installed or applied by the builder and included in the cost of the home. The interior finishing materials can reduce energy consumption by adding insulative value to the shell of the house, by minimizing infiltration losses, and by serving as interior reflective surfaces and reducing the need for artificial lighting in the home.

Any material added to the shell of the home will add some insulative value. Some interior finishing materials, however, have much greater insulating value than others. The following chart shows the insulative value of the commonly used finishing materials:

MATERIAL	R-VALUE*
plasterboard 1/2" thick	0.45
paneling, softwood 1" thick	1.25
paneling, hardwood 1" thick	0.95
cork wallcovering 1/8" thick	0.44
acoustic tile	2.75
terrazo 1" thick	0.08
concrete 1" thick	0.08
linoleum flooring	0.05
vinyl flooring	0.05
rubber floor tiles	0.05
carpet with fibrous pad	2.08
carpet with foam rubber pad	1.23
(for comparison) 1" fiberglass	3.3

*Remember, the higher the "R-Value," the better for insulation.

Adding acoustic tile to the ceilings, cork to walls, and carpet with fibrous pad to floors could significantly increase the R-Value of the housing shell.

Carpeting can improve the comfort and beauty of the home, plus save energy. Heat loss can be cut from 5-13% when carpeting is used throughout the house. Floors, particularly those over uninsulated crawl spaces and on slabs, tend to be uncomfortably cool. Carpets are warmer to the touch and offer more insulation than tile, wood, slate, or resilient floor coverings. The advantages of carpeting as an insulative finishing material are: (1) it is often cheaper to install than other flooring materials, (2) it may be installed in new or existing homes, and (3) it is easily maintained. Of course, insulation under the floor is more effective than carpeting as an insulator, but carpeting helps, too. Wall-to-wall carpets, laid over a cushion or pad, have greater insulating qualities than room-size or area rugs. Generally, the thicker and denser the carpet, the greater the insulation value. Wool and acrylic fibers provide the best insulation; nylon is the least effective.

Carpeting in the kitchen is a matter of personal choice; however, it is warmer than resilient or hard flooring. A good-quality kitchen carpet should consist entirely of man-made fibers. The face should be a nonabsorbent fiber, the backing water-resistant. For practical purposes, a multicolor or tweed carpet may be desirable.

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6M-9-78; 3M—9-79

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Set heating/cooling thermostat

PERFORMANCE OBJECTIVE: Given access to a thermostat, glass tube thermometer, tab of padding, tape and scissors, set thermostat to assigned degree. The thermostat temperature reading will be identical to that on a glass tube thermometer when taped a few inches away from the thermostat.

I. TEACHER PREPARATION

Tools and Equipment: _____

_____

Instructional Materials: _____

_____

References: Energy Savers Catalog - By the Editors of Consumer Guide

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Prepare a pictorial display of thermostats.
- Discuss primary purposes of a thermostat.
- Review the objective.
- Present overview of lesson.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble equipment		. Glass tube thermometer . Cloth padding . Tape . Thermostat
2. Tape a glass tube thermometer near thermostat. . Place small tab of padding under thermometer. . Tape thermometer over padding insuring no outside temperature influences. . Allow thermometer to stabilize (15 minutes).	. Demonstrate the taping of a glass thermometer on a small padding near the simulated thermostat. . Observe thermometer readings.	
3. Compare the reading on the glass tube thermometer with what the thermostat needle shows the temperature to be in the room. . Accuracy of calibration . Variation of calibration	. Compare readings and record on chalk board. . Ask each student to observe and record readings on both the thermometer and thermostat.	
4. Remove dust from thermostat.	. Demonstrate opening face plate of thermostat. . Demonstrate removing dust by blowing own breath or with plastic squeeze bottle. . Rub an index card between open contact points to remove dust, if not sealed in glass.	. Thermostat in home economics department or a model attached to a display board. . Plastic squeeze bottle. . Index card

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
5. Set thermostat.	. Demonstrate placement of assigned setting.	. Thermostat

IV. SUMMARY: (Review main points, draw conclusions)

. Discuss purpose of a thermostat.
. Review steps in checking accuracy of thermostat.

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Set heating/cooling thermostat with a reading identical to that of a glass thermometer taped near the thermostat.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

Ask students to check their own thermostats for accuracy of calibration and then report accomplishments/findings to class.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Replace faucet washer

PERFORMANCE OBJECTIVE: Given access to equipment and supplies, replace faucet washer. The faucet must not drip or make vibrating noises.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: Textbook, Home Maintenance - William Weiss, Charles A. Bennett Co., Inc. 1978.

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Emphasize the importance of replacing worn faucet washers to conserve energy.
- State objective and give overview of lesson.
- Give student reading assignment on replacing a washer. Suggested reference: Home Maintenance, William Weiss, pp. 50-53.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble equipment/supplies Equipment/Supplies - Selection and Use . Open-end wrench . Screwdriver . Knife . Washer	. Display equipment and supplies needed to replace a faucet washer. . Discuss selection and use of equipment/ supplies.	. Equipment . Supplies
2. Replace Washer Procedure 1. Shut off water supply to faucet 2. Open faucet 3. Remove faucet handle 4. Remove cap nut and stem 5. Remove bib screw 6. Remove worn washer 7. Replace washer 8. Tighten bib screw 9. Replace stem, cap nut,handle and decorative metal cover.	. Demonstrate procedure for replacing a faucet washer. . Discuss purpose of each step. . Discuss the value of replacing worn faucet washers to conserve energy. . Direct students to replace a faucet washer.	. Plumber . Equipment . Supplies . Equipment . Supplies

IV. SUMMARY: (Review main points, draw conclusions)

Emphasize main points of the following as necessary:

- Assemble equipment/supplies
- Replace washer

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Given access to equipment and supplies, replace faucet washer. The faucet must not drip or make vibrating noises.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Survey home to determine if faucet washers need replacing in order to conserve energy. Report findings in class.
- Plan growth experience to replace faucet washer.
- Give preview of next lesson.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Select appliance using energy guide labels

PERFORMANCE OBJECTIVE: Given an assigned appliance, three energy guide labels for competing models, select one appliance. The selected appliance must be the model with the lowest energy cost or highest energy efficiency rating.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: _____

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Display energy guide labels for the seven categories of major household appliances.
- Emphasize the value of using energy guide labels for comparative shopping.
- Distribute handouts - "Understanding Energy Guide Labels"
  "How To Use The Energy Guide Labels"
- State objective and give overview of lesson.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Assemble energy guide labels . Categories . Refrigerators and Refrigerator-freezers . Freezers . Water heaters . Dishwashers . Clothes washers . Room air conditioners . Furnaces . Types . Generic . Energy conservation information . Energy Fact Sheet . Cost . Estimated annual energy cost of the model. . Cost Grid-Indication of actual cost of operation, depending on the local utility rate and frequency of use. . Capacity and other features of the model. . Energy Efficiency Rating . Energy efficiency rating number . Cost and usage grid	. Display energy guide labels for the seven categories of appliances. . Discuss the purpose of energy guide labels. . Assemble energy guide labels according to types. . Discuss the purpose of different types of labels for different types of appliances. . Define terms.	Energy Guide Labels Handout, "Understanding Energy Guide Labels"

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
. Placement of labels on appliances (upper right corner of the appliance front except for air conditioners, which use a hang tag that will be taped on some models).	. Discuss placement of energy guide labels on appliances.	Handout, "Where Do The Labels Go?"

IV. SUMMARY: (Review main points, draw conclusions)

Emphasize main points of the following as necessary:

1. Assemble and catagorize energy guide labels
2. Select appliance

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Given an assigned appliance, three energy guide labels for competing models, select one appliance. The selected appliance must be the model with the lowest energy cost or highest energy efficiency rating.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Survey home appliances to determine if they bear energy labels.
- Visit businesses that sell appliances to study energy guide labels and report findings in class.
- Give preview of next lesson.

AVERAGE LIFE EXPECTANCY OF NEW APPLIANCES

Appliance	Expected lifetime (years)
Refrigerators and refrigerator-freezers	15
Freezers	18-20
Dishwashers	11
Clothes washers	11
Water heaters	10-12
Room air conditioners	12-15
Furnaces	20

Source: Based on averages from Home Economics Research, March 1975, p. 169, and Department of Energy estimates.

EXPLANATION OF THE LABEL

The yellow EnergyGuide label will initially be required on seven categories of major household appliances:

- Refrigerators and refrigerator-freezers
- Freezers
- Water heaters
- Dishwashers
- Clothes washers
- Room air conditioners
- Furnaces.

The labels will give consumers the information they need to compare the energy costs or energy efficiencies of competing products before they purchase one of these appliances.

There are three different types of label for different types of appliances. One type of label displays general information (see Exhibit 1) and directs consumers to a fact sheet that serves as a point-of-sale comparative shopping document. This so-called generic label is for furnaces that are sold as varying components of heating and cooling systems. Similar labels will be required for central air conditioners when testing procedures are finalized. The second type of label shows the estimated annual energy cost of the model (see Exhibit 2). This dollar disclosure is required for all product categories except climate-control appliances, such as room air conditioners, which must be labeled with an energy efficiency rating (see Exhibit 3).

We will now discuss each of the three labels in depth so you will know where to find the information on the labels and why there are different label formats.

GENERIC LABEL

The generic label (Exhibit 1), which is required on all furnaces, contains general information on conserving energy in the home. It also directs the consumer to an energy fact sheet, which contains information on different combinations of system components and specifies the overall efficiency of the different combinations. The fact sheet will also disclose the energy cost of the system for different geographic locations and utility rates.

COST LABEL

There are two variations of the cost label. The first variation (Exhibit 2) wil be used on all refrigerators and refrigerator-freezers, freezers, and water heaters. This label shows:

- The capacity and other features of the model
- A warning not to remove the label
- A statement that the energy cost is based on standard government tests.

The big number is the estimated annual energy cost of the model. In estimating the annual energy costs of the different appliances, the Department of Energy (DOE) had to determine how often the average consumer uses each appliance in one year, and how much the consumer pays, on average, for different types of energy. For example, DOE found a national average electricity rate of 4.97¢ per kilowatt-hour. They also assumed that an appliance such as a refrigerator-freezer or a freezer runs all the time. Therefore, the big number on the label in Exhibit 2 is the estimated annual energy cost of this particular model of refrigerator, assuming 100 percent running time and an electricity rate of 4.97¢ per kilowatt-hour. The smaller numbers show the range of estimated energy costs for competing products of the same capacity, assuming the same running time and electricity rate.

The big number, or estimated annual energy cost, is an <u>average</u> figure that consumers can use in comparing the costs of competing products. For example, if we were comparing two refrigerators of the same capacity, we could tell which costs less to operate and, therefore, which is more energy-efficient by looking at the big numbers.

A cost grid is also provided on each label to give consumers an indication of the actual cost they can expect, depending on the local utility rate. For example, if you pay 6¢ per kilowatt-hour of electricity, it would cost you $85 per year to run the refrigerator matching the label in Exhibit 2.

The second variation of the cost label is for dishwashers and clothes washers (see Exhibit 4). It is very similar to the label for refrigerators and freezers. It shows:

- The capacity of the model
- A warning not to remove the label
- A statement explaining the basis of the energy cost figure.

The only difference in this label is that it shows two sets of costs -- one set of costs for electric water heaters, and one for gas water heaters. This is because the main expense of using a dishwasher or clothes washer is the cost of heating the water, and 90 percent of all water heaters in this country are fueled by electricity or gas.

Again, the big number is the average annual energy cost of this particular model. For example, with a gas water heater, the estimated annual energy cost of this dishwasher is $31.00, assuming the national average gas rate of 36.7¢ per therm and the average usage rate established by DOE. The smaller numbers show the range of estimated energy costs for competing products of the same capacity, assuming the same gas rate and usage patterns.

As on the refrigerator labels, cost grids are provided on each label to give consumers an indication of the actual costs they can expect, depending on their local utility rate and frequency of use. As you can see, there is one cost grid for electricty and one for gas.

The annual energy cost of a clothes washer or dishwasher also depends on how often the consumer uses the appliance, so the number of loads per week has been added to the cost grid on this label. For example, if you wash 6 loads of disnes per week and pay 40¢ per therm to heat the water, you could expect an actual energy cost of $25.00 per year.

EER LABEL

The label showing energy efficiency ratings (Exhibit 3) will be used for room air conditioners. This label displays the same capacity information, warning, and cost-basis information as the other labels. However, instead of an estimated annual energy cost, these climate control appliances are labeled with an energy efficiency rating, or EER, as well as a range of energy efficiency ratings for competing products of the same capacity.

An energy efficiency rating is a number indicating the relative energy efficiency of similiar appliances. The higher the EER number, the more efficient the appliance. For example, EERs for room air conditioners are as low as 5.4 and as high as 11.5. An 11.5-rated room air conditioner is more than twice as efficient as a 5.4-rated unit of the same capacity. In other words, it will use less than half as much electricity.

Climate control equipment is different from the other appliances covered under the labeling rule. Refrigerator-freezers, clothes washers, and the other products function upon demand of the consumer. Air conditioners and furnaces, on the other hand, are climate sensitive -- their energy costs vary greatly, depending on the region. For example, the estimated annual cost of running an air conditioner in Houston, Texas, where the weather is extremely hot and humid, is much higher than in Detroit, Michigan, where the summers are relatively short and mild. An average cost disclosure for these products clearly would not be useful to the consumer, given the radical differences in climate across the country.

During the last 6 years, however, the American Refrigeration Institute has established procedures for testing air conditioning appliances and assigning them energy efficiency ratings. Consumers are familiar with these ratings and are already using this information in making their purchase decisions.

Besides the energy efficiency rating, the EER label also displays a cost and usage grid so that the consumer can calculate the energy cost of the model, based on his or her annual usage and electricity rate. For example, if you run your air conditioner 750 hours per year (the same as running an air conditioner 12 hours a day for 2 months) and pay 6¢ per kilowatt-hour of electricity, it would cost you $25 to run the air conditioner matching the label in Exhibit 3.

Exhibit 2

(Name of Corporation)
Refrigerator-Freezer
Capacity 17 Cubic Feet
Model(s) AH503, AH504, AH507
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.97¢ per kilowatt hour

Only models with 16.5 to 18.4 cubic feet are compared in the scale

Model with lowest energy cost
$50

$70
THIS MODEL

Model with highest energy cost
$88

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

		Yearly cost
		Estimated yearly $ cost shown below
Cost per kilowatt hour	**2¢**	$28
	4¢	$57
	6¢	$85
	8¢	$113
	10¢	$142
	12¢	$170

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 47122C)

Exhibit 3

Room Air Conditioner
Capacity: 6,000 BTU/hr

(Name of Corporation)
Model(s) FD1601

ENERGYGUIDE

Models with the most efficient energy rating number use less energy and cost less to operate

Models with 5,200 to 7,699 BTU's cool about the same space

Least efficient model
5.6

9.9

Most efficient model
10.2

THIS MODEL

Energy Efficiency Rating (EER)

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests

How much will this model cost you to run yearly?

Yearly hours of use		250	750	1000	2000	3000
		Estimated yearly $ cost shown below				
Cost per kilowatt hour	2¢	$3	$8	$11	$22	$34
	4¢	$6	$17	$22	$45	$67
	6¢	$8	$25	$34	$67	$101
	8¢	$11	$34	$45	$90	$134
	10¢	$14	$42	$56	$112	$168
	12¢	$17	$50	$67	$134	$202

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 20648)

Exhibit 4

Dishwasher
Capacity: Standard

(Name of Corporation)
Model(s) MR328, XL12, NA83

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.97¢ per kilowatt hour and a natural gas rate of 36.7¢ per therm.

Only standard size dishwashers are used in the scale.

Electric Water Heater

Model with lowest energy cost **$62**

$73 THIS MODEL

Model with highest energy cost **$92**

Estimated yearly energy cost

Gas Water Heater

Model with lowest energy cost **$26**

$31 THIS MODEL

Model with highest energy cost **$40**

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

with an electric water heater

Loads of dishes per week		2	4	6	8	12
Estimated yearly $ cost shown below						
Cost per kilowatt hour	2¢	$7	$15	$22	$29	$44
	4¢	$15	$29	$44	$59	$88
	6¢	$22	$44	$66	$88	$132
	8¢	$29	$59	$88	$117	$176
	10¢	$37	$73	$110	$146	$220
	12¢	$44	$88	$132	$176	$264

with a gas water heater

Loads of dishes per week		2	4	6	8	12
Estimated yearly $ cost shown below						
Cost per therm (100 cubic feet)	10¢	$4	$8	$12	$16	$24
	20¢	$5	$11	$16	$22	$33
	30¢	$7	$14	$21	$28	$41
	40¢	$8	$17	$25	$33	$50
	50¢	$10	$19	$29	$39	$58
	60¢	$11	$22	$34	$45	$67

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour or therm) in your area, and for estimated costs if you have a propane or oil water heater.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 73906)

HOW TO USE THE ENERGYGUIDE LABEL

If you have to choose between two appliances with the same features, capacities, and price, but different annual energy costs, then obviously you are better off buying the more energy-efficient model, or the one with the lower annual energy cost. In this case, you can simply look at the big number on each label, see which is lower, and take that model home with you.

However, in many cases, the purchase price of the more energy-efficient model is higher than the price of the standard model because of more or different kinds of insulation or more efficient motor components. Often, the lower energy cost of the more energy-efficient model will compensate for the higher purchase price over the lifetime of the appliance. The question, then, is how to figure out which model will cost you less in the long run.

We have designed a worksheet that snows you how to use the EnergyGuide label to figure out whether you are better off buying a model with a higher purchase price but lower annual energy cost (see Exhibit 5). For example, you can use the worksheet to compare the two refrigerators whose labels and prices are shown in Exhibit 6.

First, you need to fill in the answers to the questions on the top half of the worksheet:

1. Are the appliances comparable in size and features?
2. What is the price of the energy-efficient model? What is the price of the standard model?
3. How often will you use the product?
4. What is your local energy rate? How much will each model cost you to run yearly, based on your local energy rate?
5. How long do you expect to keep the appliance?

1. Are the appliances comparable in size and features? As you recall, to find the capacity of the model, look just under the word "EnergyGuide" on the right hand side of the label. The refrigerators in this example are both between 16.5 and 18.4 cubic feet, so the answer to the first questions is "yes" (see Exhibit 7).

2. What is the price of the energy-efficient model? What is the price of the standard model? The energy-efficient model is the one with the lower yearly energy cost or, in the case of air conditioners, the higher energy efficiency rating. As you can see in Exhibit 6, the label on the first model in our example shows an average yearly energy cost of $51; the label on the second model, a cost of $70. In this case, therefore, the model with the yearly energy cost of $51 is the more energy-efficient appliance, and the one with the yearly energy cost of $70 is the standard model. Now look at the price tags of the two refrigerators. The energy-efficient model is priced at $545 and the standard model at $485. (If you wanted to, you could also add sales tax and delivery charges, if any, to the price of each model.)

3. How often will you use the product? This question is irrelevant for refrigerators, freezers, and water heaters, which run continuously. However, you will need to answer this question for clothes washers, dishwashers, and air conditioners, whose usage rates vary widely.

4. What is your local energy rate? Assume, for this example, that your local electricity rate is 5.4¢/kWh. Because the cost grid on the label is organized in intervals of 2¢ you will need to round off the rate -- in this case, to 6¢/kWh.

How much will each model cost you to run annually, based on your local energy rate? Checking the cost grids on the labels at 6¢/kWh, you see that the standard model will cost you approximately $85/yr and the energy-efficient model will cost you approximately $62/yr to run.

5. How long do you expect to keep the appliance? The average life of a refrigerator-freezer is approximately 15 years. However, assume, for this example, that you will move in 10 years and leave the appliance behind.

Once you have answered these five questions, you can figure out whether you are better off buying the more energy-efficient appliance by performing the calculations on the bottom half of the worksheet.

As shown on the worksheet, you first need to calculate the difference in price between the two appliances by subtracting the cost of the standard model ($485) from the cost of the more energy-efficient model ($545). The price difference in this case is $60.

Next, estimate the amount of money you will save each year (based on your local energy rate), with the more energy-efficient model by subtracting the annual energy cost of the energy-efficient model ($62) from the annual energy cost of the standard model ($85). In this case, your annual energy-cost savings will be $23.

You can then calculate the total amount of money you will save with the more energy-efficient appliance by:

1. Multiplying the annual energy-cost savings ($23) by the number of years you expect to keep the appliance (10 yrs), for a total of $230.

2. Subtracting the initial price difference ($60) from $230 to get the total energy-cost savings with the more energy-efficient appliance.

Thus, the total savings in this example is $170 over 10 years; that is, by paying an extra $60, you can save $170 in energy costs if you keep the appliance for 10 years.

Finally, you can figure out how soon you will recover the extra $60 you have to pay for the more energy-efficient appliance by dividing the price difference ($60) by the annual energy-cost savings ($23). In this case, it would take you about 2-1/2 years to break even with the higher-priced, but more-efficient, model.

In summary, you can use the energy-cost information on the label to determine:

- Which appliance costs less to run
- Whether you are better off buying an appliance with a higher initial purchae price but lower annual energy cost.

Exhibit 5

How To Use the EnergyGuide Label

First, you need to answer five questions

1. **Are the appliances comparable in size and features?** _____ _____

2. **What is the price of the energy-efficient model?** _____
   (model with lower yearly energy cost *or* higher energy efficiency rating)

   What is the price of the standard model? _____
   (model with higher yearly energy cost *or* lower energy efficiency rating)

3. **How often will you use the product?** _____

4. **What is your local energy rate?** _____ ¢/kWh

   _____ ¢/therm

   How much will each model cost you to run yearly, based on your local energy rate? (see grid)

   Standard model _____

   Energy-efficient model _____

5. **How long do you expect to keep the appliance?** _____

Then you can figure out whether you are better off buying the more energy-efficient appliance

First, calculate the price difference:

Cost of energy-efficient model	$ _____
minus cost of standard model	– _____
Price difference	**$** _____

Second, estimate your annual energy-cost savings with the more energy-efficient model:

Annual energy cost of standard model	$ _____
minus annual energy cost of energy-efficient model	– _____
Annual energy-cost savings	**$** _____

Third, calculate your energy-cost savings over the life of the appliance:

Annual energy-cost savings	$ _____
multiplied by years you expect to keep the appliance	X _____ yrs
	$ _____
minus price difference	– _____
Energy-cost savings over life of appliance	**$** _____

Finally, figure out how soon you can expect to recover your investment:

Price difference	$ _____
divided by annual energy-cost savings	÷ _____
Years to recover investment	_____ yrs

Exhibit 6

$545

(Name of Corporation)
Refrigerator-Freezer
Capacity 17 Cubic Feet
Model(s) F117, F317
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.97¢ per kilowatt hour

Only models with 16.5 to 18.4 cubic feet are compared in the scale

Model with lowest energy cost **$50**

$51

Model with highest energy cost **$88**

THIS MODEL

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests

How much will this model cost you to run yearly?

		Yearly cost
		Estimated yearly $ cost shown below
Cost per kilowatt hour	**2¢**	$21
	4¢	$41
	6¢	$62
	8¢	$82
	10¢	$103
	12¢	$124

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 3110261)

96

$485

(Name of Corporation)
Refrigerator-Freezer
Capacity 17 Cubic Feet
Model(s) AH503, AH504, AH507
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.97¢ per kilowatt hour

Only models with 16.5 to 18.4 cubic feet are compared in the scale

Model with lowest energy cost **$50**

$70

Model with highest energy cost **$88**

THIS MODEL

Estimated yearly energy cost

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests

How much will this model cost you to run yearly?

		Yearly cost
		Estimated yearly $ cost shown below
Cost per kilowatt hour	**2¢**	$28
	4¢	$57
	6¢	$85
	8¢	$113
	10¢	$142
	12¢	$170

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 3110262)

97

50.

Exhibit 7

How To Use the EnergyGuide Label

First, you need to answer five questions

1. **Are the appliances comparable in size and features?** Yes
2. **What is the price of the energy-efficient model?** $545.
   (model with lower yearly energy cost *or* higher energy efficiency rating)
   What is the price of the standard model? $485.
   (model with higher yearly energy cost *or* lower energy efficiency rating)
3. **How often will you use the product?** continuously
4. **What is your local energy rate?** 6 ¢/kWh
   _____ ¢/therm
   How much will each model cost you to run yearly, based on your local energy rate? (see grid)
   Standard model $85.
   Energy-efficient model $62.
5. **How long do you expect to keep the appliance?** 10 yrs.

Then you can figure out whether you are better off buying the more energy-efficient appliance

First, calculate the price difference:

Cost of energy-efficient model	$ 545
minus cost of standard model	- 485
Price difference	$ 60

Second, estimate your annual energy-cost savings with the more energy-efficient model:

Annual energy cost of standard model	$ 85
minus annual energy cost of energy-efficient model	- 62
Annual energy-cost savings	$ 23

Third, calculate your energy-cost savings over the life of the appliance:

Annual energy-cost savings	$ 23
multiplied by years you expect to keep the appliance	x 10 yrs
	$ 230
minus price difference	- 60
Energy-cost savings over life of appliance	$ 170

Finally, figure out how soon you can expect to recover your investment:

Price difference	$ 60
divided by annual energy-cost savings	÷ 23
Years to recover investment	about 2 1/2 yrs

HOW TO FIGURE WHETHER THE ENERGY EFFICIENT MODEL IS A BETTER BUY FOR YOU

		Standard Model	Energy Efficient Model	Difference
1.	Purchase Price	$_____	$_____	$_____
	Cost of Operating			
2.	Yearly cost (copy from appliance label)			
3.	How many years do you expect to keep it?	_____yrs.	_____yrs.	0
4.	Total operating cost (multiply yearly cost by number of years you will keep it)	$_____	$_____	$_____
5.	Total Cost to you (Add Purchase Price, line 1, and Total operating cost, line 4)	$_____	$_____	$_____

- -

NOTE: To figure how long it will take to recover the extra cost of the energy efficient model, divide the Difference in Price from line 1 by the Difference in Yearly Operating cost from line 2.

Difference in Purchase Price	÷	Difference in Yearly cost	=	Years to Recover
$_____	÷	$_____	=	_____yrs.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Install Shower Flow Control

PERFORMANCE OBJECTIVE: Given a performance guide, an adjustable wrench and supplies, install a shower flow control. The shower head must fit onto shower arm and not be marred by plumbing tool.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: "Centsable Home Improvement Projects" p. 30.

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Display different types of shower flow controls.
- Handout "Shower Flow Control Installation Instructions."
- Emphasize importance of the task.
- State objective and give overview of lesson.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Review instructions	. Conduct oral review of installation instructions.	. Handout - "Shower Flow Control Installation Instructions."
2. Assemble equipment/supplies Selection and Use . Adjustable wrench . Shower flow control . Shower head	. Display equipment/supplies. . Conduct group discussion on selection/use of equipment and supplies. . Discuss purpose of installing a shower flow control.	. Equipment . Supplies
3. Install shower flow control Procedure . Remove shower head from threaded shower arm. . Insert flanged end of flow control into shower head. (Check for straight alignment) . Insert narrow end of flow control into shower arms until shower head threads engage shower arm heads. . Thread shower head onto shower arm by hand and tighten with wrench.	. Demonstrate procedure for installing a shower flow control in a shower head. . Discuss purpose of each step. . Discuss precautions.	. Handout, "Shower Flow Control Installation Instructions."

IV. SUMMARY: (Review main points, draw conclusions)

Emphasize main points of the following as necessary:

1. Review instructions.
2. Assemble equipment/supplies.
3. Install shower flow control.

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Given instructions, an adjustable wrench and supplies, install a shower flow control. The shower head must fit onto shower arm and not be marred by plumbing tool.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Ask students to survey local businesses to determine if shower flow controls are available for purchase. If not, suggest that they be stocked.
- Suggest that students install a shower flow control in their home to conserve energy.
- Compare utility bills (gas, electric and water) before and after installing a shower flow control.
- Prepare public information article on shower flow controls for local newspaper.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Insulate Water Heater

PERFORMANCE OBJECTIVE: Given access to water heater or simulated water heater, equipment and supplies, insulate a water heater. The insulation must be fastened securely to water heater without lapping or being compressed and with openings for heat controls, pipes and air vents

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: _____

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Emphasize the value of insulating a water heater.
- Display insulation kit for home water heater, bat insulation and duct tape.
- Improvise water heater using cardboard or metal can.
- Distribute handout, "Insulating a Water Heater."
- State objective and give overview of lesson.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Review instructions, safety precautions and standards . Instructions . Safety precautions . Standards	. Review instructions for insulating a gas and electric water heater. . Discuss safety precautions. . Review standards for insulating a gas and electric water heater.	. Handout - "Insulating a Water Heater"
2. Assemble supplies/equipment Supplies - Selection/Use . Insulation kit (sized according to capacity of water heater) . Bat insulation . Foil back . 3-3 1/2 inches wide (R-11) . Duct tape Equipment - Selection/Use . Scissors or knife . Tape measure . Water heater	. Display supplies. . Conduct group discussion on selection and use of supplies. . Display equipment . Conduct group discussion on selection and use of equipment.	. Supplies . Equipment
3. Insulate water heater Electric . Using insulation kit . Follow manufacturer's instructions . Safety precautions . Using bat insulation . Measure circumference and height . Cut pieces to fit . Lay flat and tape . Wrap heater with foil to outside . Secure with duct tape . Cut piece for top . Mark location of elements, drain valve and electrical connections . Cut openings for the heater controls, pipes and air vents	. Demonstrate procedure for insulating an electric water heater. . Discuss purpose of insulation. . Discuss types of insulation and their application. . Discuss safety precautions.	. Handout- "Insulating a Water Heater" . Supplies . Equipment

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
Gas . Using insulation kit . Follow manufacturer's instructions . Safety precautions . Using bat insulation . Measure circumference and height to be insulated (Note: Height includes area from pilot light and temperature controls to top of tank.) . Cut pieces to fit . Lay flat and tape . Wrap heater with foil to outside . Secure with duct tape . Cut excess insulation from access area of pilot light and temperature controls	. Demonstrate procedure for insulating a gas water heater. . Discuss safety precautions. . Have students insulate a water heater or simulated water heater	. Handout- "Insulating a Water Heater" . Supplies . Equipment . Handout - "Insulating a Water Heater" . Supplies . Equipment

IV. SUMMARY: (Review main points, draw conclusions)

Emphasize main points of the following as necessary:
- . Review instructions/safety precautions/standards.
- . Assemble equipment/supplies.
- . Insulate water heater (Electric/gas).

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Given access to water heater or simulated water heater, equipment and supplies, insulate a water heater. The insulation must be fastened securely to water heater without lapping or being compressed and with openings for heat controls, pipes and air vents.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- . Direct students to insulate a simulated water heater, if one isn't available in department.
- . Suggest that students insulate home water heater.
- . Give preview of next lesson.

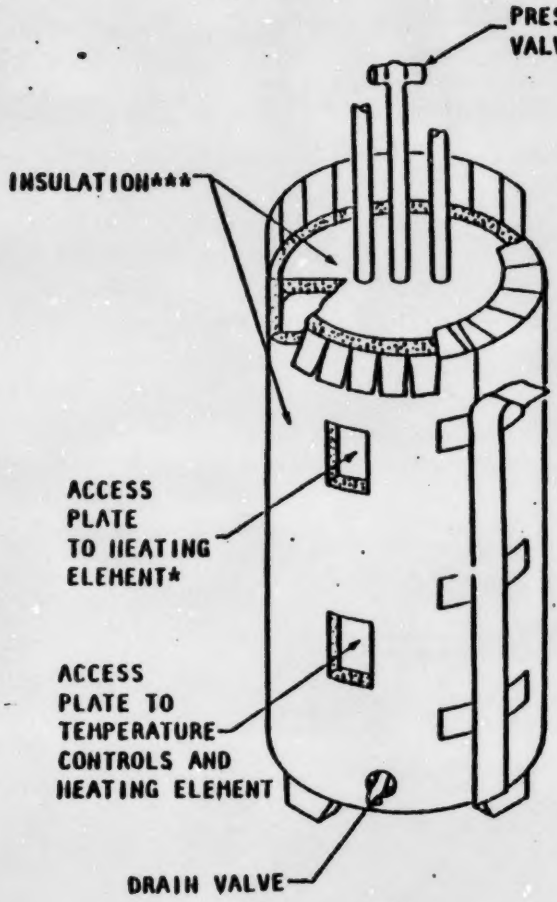

Figure 7. Electric Water Heater

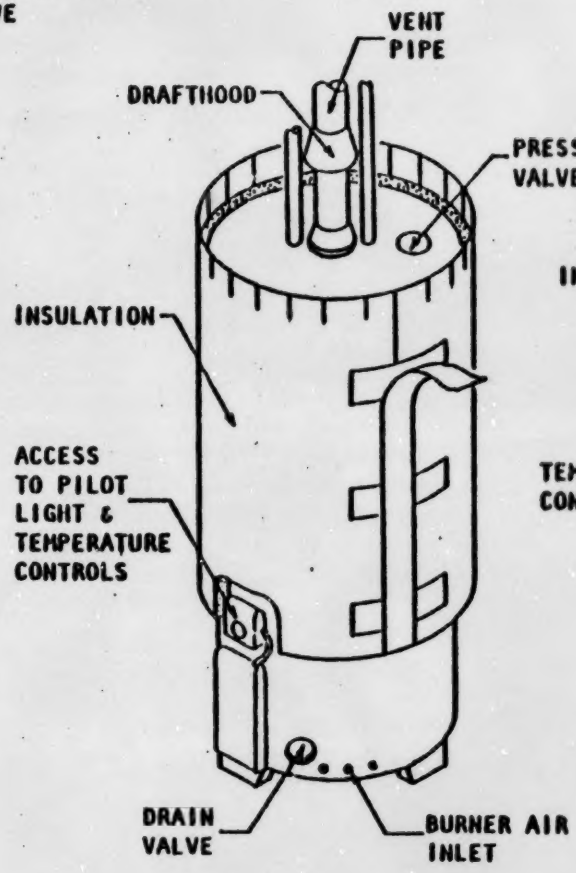

Figure 8. Gas-Fired Water Heater

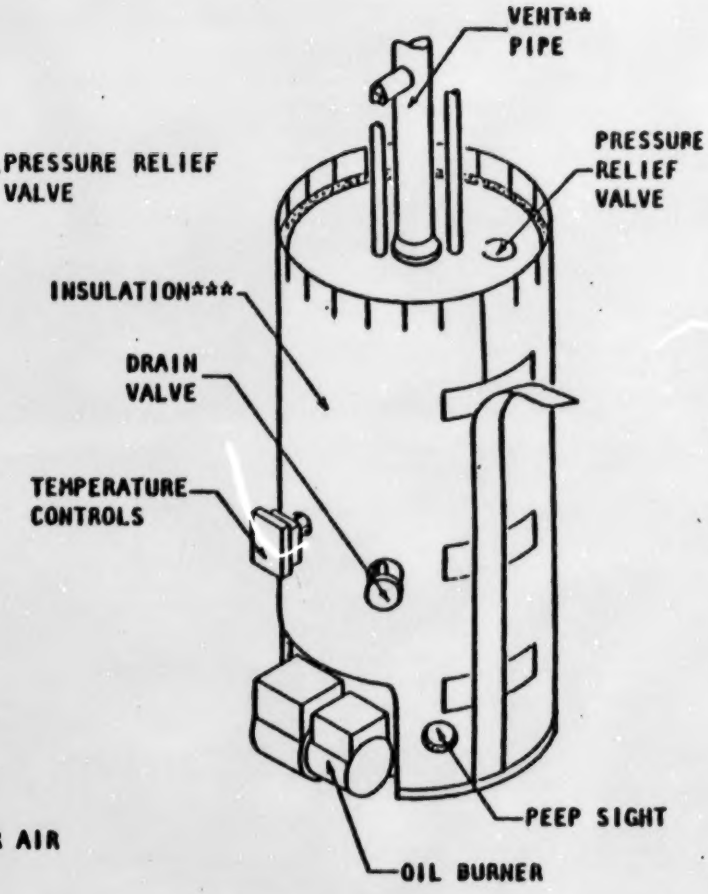

Figure 9. Oil-Fired Water Heater

* Only found on water heaters with two heating elements.
** The pipe may be side-mounted.
***Top insulated on all electric water heaters and oil-fired water heaters with side-mounted flue pipes.

HOME ECONOMICS EDUCATION
PLAN OF INSTRUCTION

UNIT: _____ DATE: _____

TASK: Make a draft stopper

PERFORMANCE OBJECTIVE: Given a performance guide, access to material, equipment and supplies, make a draft stopper. The draft stopper must be even in width, firm, flexible and fit width of an assigned door and casing.

I. TEACHER PREPARATION

Tools and Equipment: _____

Instructional Materials: _____

References: _____

Other Resources: _____

II. PREPARATION OF LEARNER: (Establish Set/Motivation)

- Display draft stoppers made from different types of fabrics.
- Display supplies and equipment to make draft stoppers.
- Handout "Draft-Dodgers" prepared by Alabama Cooperative Extension Service.
- Emphasize values derived from using draft stoppers.
- State objective and give overview of lesson.

III. CONTENT OF LESSON:

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
1. Review instructions	. Review instructions for making a draft-stopper using handout. . Discuss characteristics of a draft stopper. . Discuss purpose of a draft stopper. . Display a variety of draft stoppers.	. Handout - "Draft-Dodgers" prepared by Alabama Cooperative Extension Service . Draft-stoppers
2. Assemble supplies/equipment <u>Selection and Use</u> . Fabric - Inner tube - denim, garbadine, twill, etc. with sturdy hard finish - Outer tube - durable and tightly woven in a color to compliment color scheme- . Supplies Heavy duty thread Sand (fine, with no stones or salt) Shears Tape measure/yard stick Funnel Colander Pins	. Display supplies/equipment . Discuss selection and use of supplies/equipment.	. Handout- "Draft-Dodgers" . Supplies . Equipment

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
3. Measure for length (door and casing width) Systems for measuring . Standard . Metric	. Display measuring equipment. . Demonstrate measuring door and casing width to determine length of draft stopper. . Direct student to determine length in metric and standard measurements. . Lead group discussion to summarize.	. Handout - "Draft Dodger" . Measuring equipment
4. Prepare fabric Procedure for straightening fabric . Pull thread and cut . Clip and tear, if possible	. Demonstrate procedures for preparing fabric to make draft stopper. . Preparing fabric to make draft stopper. . Lead group discussion to summarize.	. Fabric . Shears
5. Measure and cut draft stopper Inner tube - Width - 8 inches (6 inches plus 2 inches for seams) - Length - Door and casing width plus 2 inches for seam allowance. Outer tube - Width- 9 inches (6 inches plus 2 inches for seams plus 1 inch for cord) - Length - Door and casing width plus 2 inches for seam allowance.	. Demonstrate procedure for measuring and cutting fabric for draft stopper. . Lead group discussion to summarize.	. Fabric . Measuring equipment . Cutting equipment . Handout - "Draft Dodgers"
6. Make inner tube Procedure . Fold fabric lengthwise . Stitch along length and one end leaving one end open. (1 inch seam allowance) . Turn tube right side out . Fill inner tube with sifted dry sand- firmly pack. . Close end by folding in raw edges and top stitching.	. Display completed inner tube. . Demonstrate procedure for making inner tube. . Discuss procedure. . Discuss the type of sand needed to fill draft stopper. . Demonstrate procedure for filling and closing of inner tube.	. Inner tube model . Fabric . Equipment . Filling - sand . Equipment . Supplies . Handout -"Draft Dodgers"

ENABLING OBJECTIVES/CONTENT	METHODS/ACTIVITIES	RESOURCES
7. Make outer tube Procedure . Fold fabric lengthwise . Stitch along length and one end leaving one end open (1 inch seam allowance) . Turn tube right side out	. Display completed outer tube. . Demonstrate procedure for making outer tube. . Discuss procedure	. Outer tube model . Fabric . Equipment
8. Cover inner tube Procedure . Insert sand-filled inner tube into outer tube. . Close end Fold in raw edges Top stitch	. Display completed draft-stopper. . Demonstrate procedure for completing draft stopper. . Discuss procedure.	. Completed draft stopper . Inner tube . Outer tube . Equipment

IV. SUMMARY: (Review main points, draw conclusions)

Emphasize main points of the following as necessary:

1. Review instructions
2. Assemble supplies/equipment
3. Measure for length
4. Prepare fabric
5. Measure and cut
6. Make inner tube
7. Make outer tube
8. Cover inner tube

V. CRITERION REFERENCED MEASURE: (Determine if learner has reached objective.)

Given a performance guide, access to material, equipment and supplies, make a draft stopper. The draft stopper must be even in width, firm, flexible and fit width of an assigned door and casing.

VI. ASSIGNMENT: (Explanation of what is expected at next class session)

- Assign students task of making a draft stopper for their home.
- Direct students in making draft stoppers for needy and elderly persons as an FHA/HERO project.
- Have student calculate the cost of making a draft stopper. Compare cost with the price of a purchased draft stopper.